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JEAN-SYLVAIN BAILLY

Astronomer, Mystic, Revolutionary

1736–1793

EDWIN BURROWS SMITH

Wayne University

THE AMERICAN PHILOSOPHICAL SOCIETY

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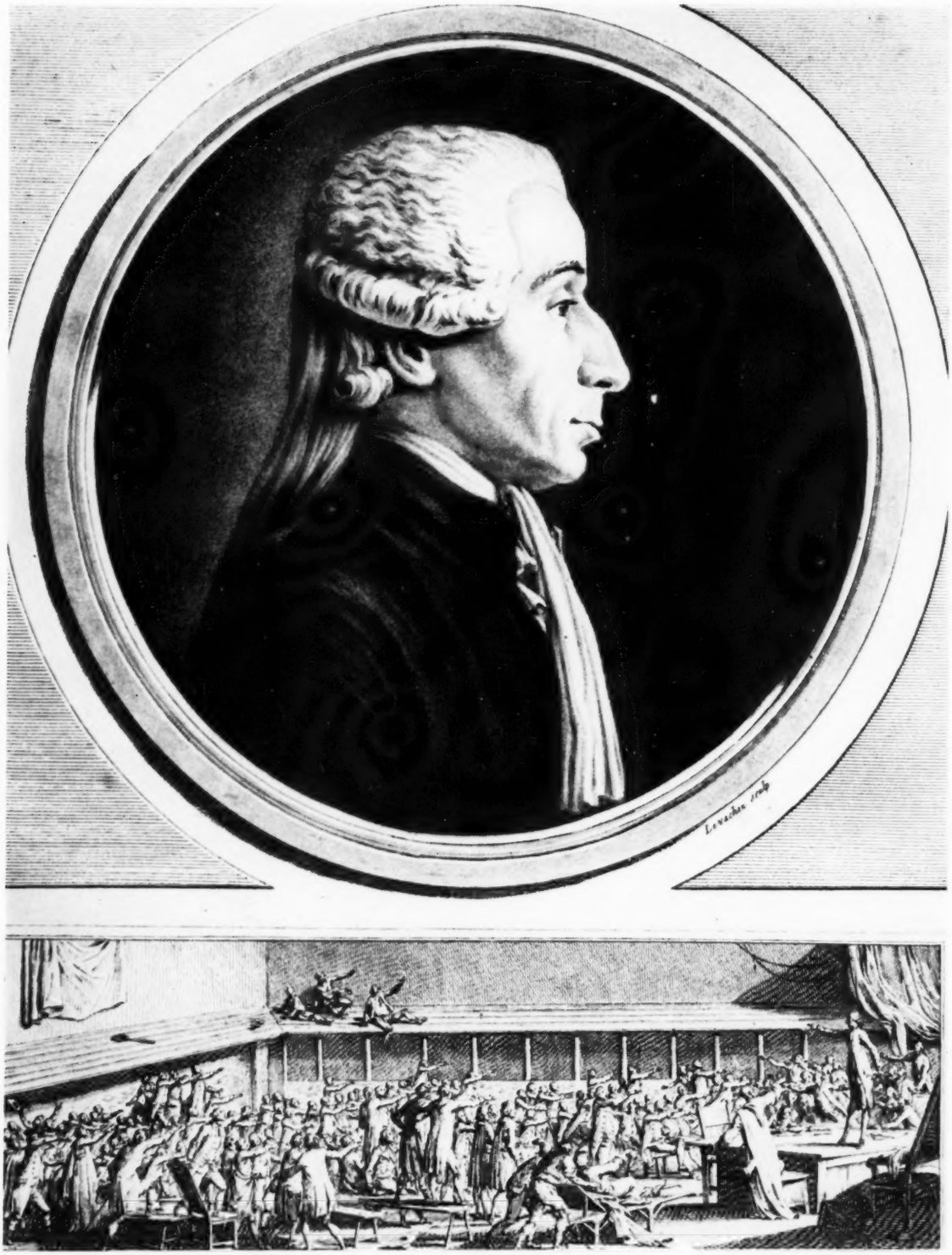

FIG. 1. Portrait of Jean-Sylvain Bailly from an engraving by Levacher. Below: *Le Serment du Jeu de Paume* (Bailly standing on the table at right) from an original engraving by Duplessi-Bertaux. Reproduced by courtesy of the John Hay Library, Brown University, Providence, Rhode Island.

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PREFACE

The naïve optimism which brought about the French Revolution was based on a curious mixture of rationalism and illuminism. It is a worn legend that the great *philosophes*—Montesquieu, Voltaire, Diderot, and Rousseau—made the Revolution. These hierophants of political liberty were all dead at least a decade before that event. The Revolution was made by a generation of lesser men who, to be sure, were much influenced by them but whose thinking was often less clear, being characterized by repeated attempts to resolve the essentially eighteenth-century dilemma of progress and primitivism, piety and Pyrrhonism. The mood of this generation finds expression in what a contemporary called the *grand ordre*. The *grand ordre* denotes a philosophy of reform based upon a belief in the perfectibility of man, the virtue and happiness of the primitive world, the corruption and misery of the modern world, and the pressing need for total revolution. The revolution envisaged by the *grand ordre* was to effect the restoration of the golden age through the dissipation of prejudice, error, and superstition and through the development of the arts, sciences, commerce and agriculture. It was an eclectic philosophy, differing from Voltaire's principally in the absence of scepticism and from Rousseau's in the absence of any real moral values. A number of modern critics have dealt with one aspect or other of the *grand ordre*, among them Carl Becker in *The Heavenly City of the Eighteenth Century Philosophers*, Auguste Viatte in *Les Sources occultes du Romantisme*, Auguste Le Flamanc in *Les Utopies prérévolutionnaires* and Daniel Mornet in *Les Origines intellectuelles de la Révolution française*, but the complete story of this phenomenon is yet to be written.

The utopian schemes of pre-revolutionary France attracted numerous enlightened men, because they were based on science and history and claimed to be authentic documents of great cosmic laws with titles of legitimacy going back to the very origin of the world. The progenitors of the *grand ordre* were, in fact, on the rationalist side, Descartes, Newton, Leibnitz, Voltaire, and Buffon—the scientists, archeologists, and historians. But the *grand ordre* was also closely related to the mystical societies, Rosicrucians, Freemasons, Swedenborgians, and quietists, who preached the doctrine of the inner church, crypto-catholicism and the millennium. There was no great leader of the *grand ordre* and no single instrument for its propagation. The most curious genius of the order was perhaps Court de Gébelin, whose doctrine Bernard Faÿ has called a mixture of "philosophic rationalism and philanthropic sentimentality." As a rationalist he was friend and colleague of Franklin and Voltaire; as a mystic he collaborated with Saint-Martin, the elegant, incomprehensible theurgist of Lyon.

Jean-Sylvain Bailly, most familiar as president of the National Assembly and first mayor of Paris, was a disciple of Court de Gébelin. Scientist and illuminist, conservative and revolutionist, he combines the contradictory forces of his generation. Born into an essentially artistic milieu, he abandoned the arts to study Newtonian physics. Under the guidance of Clairaut and Lacaille he became a respected astronomer and won wide recognition throughout Europe for his research on the satellites of Jupiter. But attracted by the mystery of astronomy in antiquity, he gradually abandoned his telescopes in favor of the historian's pen. Between 1775 and 1787 he published five weighty volumes on the history of ancient and modern astronomy and three smaller works in which he tried to retrace the course of man's development and in which he supported the theory of a primitive golden age. Bailly's sound, scholarly works won him many public honors, including membership in the Academy of Sciences, the French Academy and the Academy of Inscriptions, as well as academies in Italy, Holland, Germany, and Sweden. At the same time, his wild speculations on antiquity involved him in a series of scientific and literary quarrels in which he frequently found himself defending the indefensible views of Court de Gébelin and which caused him to be branded "frère illuminé" by some of the *philosophes*. The investigation of animal magnetism, which did so much to discredit Mesmer, brought Bailly back into contact with controlled scientific inquiry in the persons of Franklin, Lavoisier, Guillotin, and others of their kind. Participation in the report on the Hôtel-Dieu established Bailly's reputation as a champion of reform, and when the Revolution began he was among the first to be called to serve the public cause. Imbued with the notions of the Enlightenment, Bailly felt that reason might govern revolution, and he was surprised and chagrined to discover that it did not. His meteoric rise from the Paris Electoral Assembly through the presidency of the Third Estate and the National Assembly to the mayoralty of Paris came to an abrupt end on the Champ de Mars when he ordered troops to fire on the crowd. Two years later, at the beginning of the Terror, Bailly paid for his "crimes" with his head. Thomas Carlyle's overblown prose sums up the tragedy of this man inadequate to his destiny:

> Poor Bailly, how thy serenely beautiful philosophizing, with its soft moonshining clearness and thinness, ends in foul thick confusion—of presidency, mayorship, diplomatic officiality, rabid triviality, and the throat of everlasting darkness! Far was it to descend from the heavenly galaxy to the *drapeau-rouge:* beside that fatal dung-heap on that last hell-day, thou must tremble, though only with cold. . . . Speculation is not practice: to be weak is not so miserable, but to be weaker than our task.

Bailly was not a great man; little of his thinking can be called original, and his influence has totally disappeared today. But the story of Bailly's life is the story of the eighteenth-century savant, his erudition, his illusions, his optimism and his failure; and it is the story of the unwitting making of a revolution. As a thoughtful man, Bailly believed in the concept of progress; science brought him to accept the ever increasing hegemony of man over nature, and that hegemony he identified with happiness. He was, however, too prone to reduce the complexities of life to simple first principles. Convinced that the golden age had existed, he was equally convinced that it would return, and the Revolution was for him, as for many of his contemporaries, the fulfillment of this rational-mystic dream, the establishment of the *grand ordre*. It is the purpose of the present work to consider in some detail the writings of Jean-Sylvain Bailly as a proponent of the *grand ordre*.

There is no collected edition of Bailly's works. Much of the scientific material appears only in the *Mémoires* of the Academy of Sciences. Some of the early writings (e.g. the *Eloge de Corneille*) went through several, presumably small, editions from different presses. The history of astronomy had two printings over a period of years, the second edition of the first volume antedating the first edition of the last. At least three works appeared posthumously, one of them in incomplete form. The bibliography at the end of this volume is intended to offer a comprehensive checklist of Bailly's printed works, most of which I have fortunately been able to examine. However, the relative scarcity of Bailly material has made the choice of editions for textual citation somewhat arbitrary. Quotations are from the editions listed below unless otherwise indicated. For reference to Bailly's own writings, it has been found convenient to use a system of short titles. They are as follows:

ATLAN	*Lettres sur l'Atlantide de Platon*, 1779. This is the 480 page edition, number 29 in the Bibliography.
ASTR ANC	*Histoire de l'astronomie ancienne*, 1775.
ASTR IND	*Traité de l'astronomie indienne*, 1787.
ASTR MOD	*Histoire de l'astronomie moderne;* volumes 1 and 2, 1779; volume 3, 1782.
DISC MEM	*Discours et mémoires*, 1790.
FABLES	*Essai sur les fables et sur leur histoire*, An VII (1799).
HIST AC SCI	*Histoire de l'Académie royale des Sciences*, 1666–1790, Imprimerie Royale, 4° edition.
MEM AC SCI	*Mémoires de l'Académie royale des Sciences*, 1666–1790, Imprimerie Royale, 4° edition. HIST AC SCI and MEM AC SCI are normally bound together, but have separate pagination.
Mémoires	*Mémoires d'un témoin de la Révolution*, 1821–1822.
ORIG SCI	*Lettres sur l'origine des sciences*, 1777.
Recueil	*Recueil de pièces intéressantes*, 1810.
SAT JUP	*Essai sur les satellites de Jupiter*, 1766.

Other references have been made as brief as is consistent with clarity. In cases where an author is represented by only one work in the bibliography, the reference is to the author's last name, volume number if applicable, and page. I have taken the liberty of modernizing eighteenth-century spelling and accents, but have refrained from making extensive changes in punctuation except in the interest of a clear reading.

This work, in its original form a doctoral dissertation accepted at Brown University in 1950, owes much to the patient guidance of my friend and former teacher Professor Harcourt Brown. I wish to thank also Professor Charles H. Smiley, who generously consented to read and comment on the astronomical portions of the manuscript; Professors Hunter Kellenberger, Albert J. Salvan, Otto Neugebauer and the late Professor H. Carrington Lancaster for their many detailed criticisms; Dorothea Lyman Smith for able assistance with the bibliography; and Harper Brothers, Publishers, for permission to quote from John Charles Duncan's *Astronomy*.

E. B. S.

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I. EARLY LIFE

Family, youth, studies, first contacts with astronomy, membership in the Académie des Sciences, the satellites of Jupiter.

> L'orateur et le poète éveillèrent en lui l'imagination; il sentit que, doué des talents les plus opposés, libre de choisir entre la poésie et les sciences, dans les sciences mêmes où son goût l'entraînait, l'imagination saurait l'inspirer. Cependant il rencontre la géométrie, ou la raison elle-même, qui s'y montre toujours saine et invariable; saisi de respect à sa vue, il reconnaît le guide du sage. Bientôt il maîtrise l'imagination, il lui défend de troubler la raison qui marche devant lui, et ne se permet de suivre l'une que quand l'autre ne peut plus le guider.
>
> Bailly, *Eloge de Leibnitz.*

Jean-Sylvain Bailly was born September 15, 1736, in the Louvre, where his father, grandfather, and great-grandfather before him had lodged in their official capacity as Gardes des Tableaux du Roi.[1] Little is known of the youth of Jean-Sylvain,[2] but his biographers agree that it was spent in solitude and study. Mérard de Saint-Just, who knew him for thirty years, says, "Jamais il ne quitta la maison paternelle. Sa mère[3]

[1] Bailly's great-grandfather, Jacques I[er] (1634–1679), was a painter of flowers, a miniaturist, engraver, and author of the *Tapisseries du roy,* Augsburg, 1687. Jacques received his authorization to lodge in the Louvre, October 26, 1667. Jean-Sylvain's grandfather, Nicolas Bailly (1659–1736), edited in 1709 and 1710 the first catalogue of the paintings of the Louvre, *Inventaire des tableaux du roy,* Paris, Leroux, 1899. His father, Jacques II (1701–1768), was something of a gay blade and fancied himself a man of letters; two volumes of his comedies, *Théâtre et œuvres mêlées,* Paris, Nyon, 1768, appeared before his death, but his *Catalogue des tableaux du cabinet du roi au Luxembourg,* Paris, Clousier, appeared posthumously in 1777 and quite possibly through the efforts of his son.

[2] Another version of Jean-Sylvain's origins appears in Nougaret, *Anecdotes* **6**: 231, and Adolphus, *Memoirs* **1**: 161. This is directly traceable to the spurious *Vie de M. Jean-Sylvain Bailly,* Paris, 1790, which is a satirical attack published under a pseudonym (Detrou). According to this version, Bailly was born in 1725, the son of a wine merchant in the faubourg Saint Antoine, and *nephew* of the Garde des tableaux du roi. He was destined for the church, but gave up that career in favor of a law practice when his uncle died and left him a considerable inheritance. This account is without corroboration and contradicts what we do know about Jean-Sylvain for the ten years preceding his father's death.

[3] Marie-Cécile Guichon married Jacques Bailly in 1731.

voulait l'avoir auprès d'elle sans cesse."[4] It is reasonable to suppose that Jean-Sylvain, as the eldest son,[5] was expected to continue the family tradition in art. Sainte-Beuve claims that he was taught drawing but not painting.[6] Bailly seems to have retained, in any case, vestiges of an early training in art criticism, for his works are larded with references to the painters. Among his posthumous works[7] there is a sketchy compilation, perhaps the outline of a larger work, entitled "Vie des peintres allemands." It may be that this was to be Bailly's contribution to the art world in his official capacity, but the work never progressed beyond the note stage. We have only Mérard de Saint-Just's testimony that Bailly was an expert art critic and his unconfirmed statement that "devant les rois de Danemark, de Suède et différents princes étrangers, il prouva qu'il n'était pas au-dessous de la confiance qu'on devait avoir dans ses lumières comme peintre-théoricien."[8] From the death of his father in 1768 until 1785, Bailly himself bore the title of Garde des Tableaux du Roi. Ultimately he was relieved of his functions by d'Angiviller, Directeur des Bâtiments du Roi, although he continued to receive his pension and to call himself Garde Honoraire.[9]

It must be admitted, however, that Bailly was in no sense an artist. His natural bent was rather towards writing, and sometime during the 1750's he wrote two tragedies, *Clothaire*[10] and *Iphigénie en Tauride*. These were submitted to the criticism of the actor Lanoue,[11] and it would seem that the author was not encouraged to continue. Delisle de Sales says that if he had the confidence to write for the stage at twenty, at least he had the good sense at forty to throw his compositions into the fire.[12] From his "tragic period" we have only a few *poésies fugitives*, mostly occasional verse in an artificial pastoral style.[13] Bailly continued throughout his life to write such verse, and some of it has been preserved by his friend Cubières. Cubières also speaks of a comedy by Bailly entitled *Le Soupçonneux* which demonstrated that "Bailly avait une grande connaissance du monde et beaucoup de talent pour la versification."[14] This work has been lost.

Bailly was about twenty when a series of happy accidents established him in the career that made him famous. The mathematician Montcarville[15] offered to give Jean-Sylvain mathematics lessons in return for drawing lessons that his son should receive from Jean-Sylvain's father. Shortly thereafter, through a Mlle Lejeuneux "qui s'occupait de peinture"[16] and was likely a friend of the elder Bailly, he met the abbé Lacaille[17] and, through him, Clairaut.[18] Lacaille took a great liking to young Bailly and undertook to initiate him into the mysteries of higher mathematics and astronomy. Bailly's first astronomical research was the calculation of the orbit of Halley's comet, based upon observations made throughout Europe in 1759, a year in which the comet reappeared.

Halley had announced that the comet of 1682 was in fact the same that had appeared in 1531 and 1607, and he predicted its return about the end of 1758 or the beginning of 1759. Clairaut, in a paper read before the Academy of Sciences on November 14, 1758, predicted that the comet would be at perihelion on April 13, 1759. This calculation was based on the perturbing influences of Saturn and Jupiter and was intended to explain the variations in the comet's period. (The first recorded

[4] *Eloge de Bailly*, 11.

[5] Bailly had a younger brother, Bailly de Saint-Paulin, and a sister. Mérard de Saint-Just says (*loc. cit.*, 164–165) that, despite the modesty of his fortune, Bailly undertook to establish the nine children of his sister and that "il avait fait des avantages à son frère." Among the other duties that devolved upon him as the eldest son were the support of his father's two mistresses and the pensioning of his father's personal servant, Picard. (*Ibid.*, 160–161.)

[6] *Causeries du lundi* **10**: 345.

[7] *Recueil*, 1–59.

[8] *Op. cit.*, 38.

[9] *Ibid.*, 39.

[10] Lemontey (346–347) states that *Clothaire* dealt with a mythical mayor of Paris who was murdered by the populace. He claims to have read the play, and later biographers have generally accepted his statement. Sainte-Beuve (**10**: 345), however, seems to suspect a myth. Mérard de Saint-Just (15) merely refers to "une tragédie en cinq actes et rimée."

[11] Jean-Baptiste Sauvé *dit* Lanoue (1701–1760).

[12] Eloge, 606.

[13] The earliest among them: two *Chansons* of 1754 addressed to Madame M*** (probably Martinot) and Madame H*** (probably Haudigué). These ladies were honored by name the following year with *Prologues* for their *fêtes*. Bailly's brother many years later called these poems "des fleurs qu'il a semées longtemps avant ses premiers pas dans la carrière des sciences." (*Recueil*, ii.)

[14] *Recueil*, lvi.

[15] An early "city directory" entitled *Etat ou tableau de la ville de Paris*, Paris, Prault, 1760, lists under "Maîtres de mathématiques": "de Montcarville, Professeur et Censeur royal, rue de la vieille Bouclerie."

[16] Lalande, Eloge, 321.

[17] Nicolas-Louis de Lacaille (1713–1762), astronomer, member of the Academy of Sciences (1741), charged with the verification of the seventeenth-century determination of the Paris meridian. Lacaille was sent by the French government to the Cape of Good Hope, the Ile de France and the Ile de Bourbon (1750–1754) for the observation of stars in the southern hemisphere. He was the author of *Astronomiae fundamenta*, 1757; *Tabulae solares*, 1758; *Coelum australe stelliferum*, 1763; *Journal historique du voyage fait au cap de Bonne Espérance*, 1763; and *Ephémérides des mouvements célestes . . . pour le méridien de Paris* **4–6** (for the years 1745–1774). This last work was a continuation of the *Ephémérides* published by Desplaces in three volumes, covering the years 1715–1744. Volume **6** (for the years 1765–1774) was completed by Bailly after Lacaille's death.

[18] Alexis-Claude Clairaut (1713–1765), mathematician, perhaps the first Frenchman to add substantially to Newton, was the author of *Recherches sur les courbes à double courbure*, 1731; *Recueil de mémoires sur les mouvements des corps célestes*, 1740; *Théorie de la figure de la terre*, 1743; *Eléments d'algèbre*, 1746; *Théorie de la lune*, 1752; *Tables de la lune*, 1754; *Théorie des mouvements des comètes*, 1760; *Mémoires sur l'orbite apparente du soleil autour de la terre*, 1761; and *Recherches sur les comètes de 1531, 1607, 1682 et 1759*, 1762.

period was 76 years and 62 days; the second, 74 years and 322 days.) Some twenty years later Bailly was still able to recapture the excitement of this astronomical event: "Ce retour devait être une preuve sensible pour la raison vulgaire; il devait justifier Newton d'avoir assigné aux comètes des courbes fermées et des périodes réglées, comme en ont les planètes." [19]

The comet first appeared in the skies toward the end of December, 1758, and reached its perihelion on March 13, 1759—22 days short of Clairaut's prediction.

De quelque manière qu'on envisage cette erreur, soit qu'on la compare à la durée de la révolution, dont elle n'est que la 920e partie environ, soit qu'on la compare à l'altération même de la période, dont elle serait un 20e, quand on considère d'une part, qu'il a fallu suivre la comète à des distances énormes, calculer l'action répétée des planètes sur elle presqu'à chaque pas, et de l'autre qu'on a cependant tracé sa route et réglé sa marche, assez exactement pour fixer, à 22 jours près, le retour d'un astre, encore rangé au nombre des météores il y a un siècle, c'est le comble de la gloire pour l'esprit humain, la preuve des progrès surprenants de l'astronomie et de la géométrie, l'épreuve la plus décisive de la théorie de Newton, et en même temps le triomphe de M. Clairaut, qui a tiré de cette théorie ce que ce grand homme n'espérait pas lui-même en tirer.[20]

Fired with enthusiasm for this newly discovered science, Bailly was one of the many mathematicians (Clairaut, d'Alembert, and Euler were the principal ones) who set about calculating the comet's orbit in an attempt to reduce this margin of error. Apparently Lacaille had confidence in his pupil's ability, for Bailly read before the Academy of Sciences his own report on the comet, a report which was judged worthy of being printed in the Academy's collection of learned papers.[21]

L'ardeur avec laquelle je m'applique à tout ce qui appartient aux mathématiques, et particulièrement à l'astronomie, m'a fait saisir avec empressement l'occasion d'observer la comète, autant que cela ne détournait pas M. l'abbé de Lacaille, et que cela pouvait se concilier avec la règle établie dans le collège où il demeure; mais n'étant pas encore assez exercé dans les observations astronomiques pour produire celles que j'ai faites comme des mesures exactes, j'ai cru qu'il valait mieux que je me servisse de celles de M. l'abbé de Lacaille, qui a bien voulu me les communiquer toutes. C'est donc sur ses observations que sont établis les éléments de la théorie de cette comète, dont je me hâte d'apporter les résultats à l'Académie, ne désirant rien davantage que de mériter son approbation.[22]

Bailly's paper includes the calculation of the comet's perihelion, the ascending node and the inclination of its orbit. One of his remarks merited an approving nod from the Academy's secretary:

Une des remarques les plus curieuses de M. Bailly dans ce mémoire est qu'en supposant deux ellipses qui aient la même distance périhélie, dont la première soit parcourue en 27,900 jours, et la seconde en 27,735, le temps que la comète mettra à parcourir 180, ou 90 degrés de part et d'autre du périhélie, sera le même à 6m 20s de temps près dans les deux ellipses; d'où il suit que quelque longue qu'ait été l'apparition d'une comète, il n'est pas possible d'en conclure la durée de sa révolution; remarque ingénieuse et bien propre à épargner des tentatives inutiles sur ce point.[23]

The following year (1760) Bailly had his own observatory, such as it was. Although the gallery of the Louvre, facing south over the Seine, seemed a favorable enough location for astronomical observations, Bailly was cramped in the quarters he was obliged to occupy. There was nothing to be desired in the way of solidity; the room was carried entirely on vaults, and the instruments rested directly on walls six feet thick; but this advantage was balanced by other inconveniences. The room itself was only five by six feet in area, which ruled out the use of large telescopes. There was a small balcony outside the window, and Bailly had a chassis built which could be moved some ten inches beyond the window frame to permit observations to the east and west. In practice, however, most of his observations had to be made at the meridian.

For this purpose Bailly used a transit instrument with a sextant of six-foot radius. Even so, his observations were limited, for he could not see anything at an elevation of over 65°, and the sextant could not be verified either at the horizon or at the zenith. To correct the error of the sextant, he made numerous observations of the height of the sun or principal stars on the meridian. As their declinations were well established, he could thus find the altitude of the pole at his observatory.[24]

Under these unfavorable circumstances, but with great diligence and ingenuity, Bailly observed oppositions of Mars (March 7), Jupiter (August 14), and Saturn (September 17) during 1760. By his own report [25] these observations were carried out independently. We know, however, that Lacaille's observatory was located just across the river at the Collège Mazarin,[26] and it seems reasonable to suppose that Bailly was in constant communication with his teacher.

In June, 1761, Lacaille and Bailly together observed the transit of Venus. This event, although less spectacular than the return of Halley's comet, is even rarer in occurrence,[27] and the particular transit of 1761 was of

[19] ASTR MOD **3**: 189.

[20] *Ibid.*, 193–194.

[21] *Mémoires de mathématiques et de physique, présentées à l'Académie royale des Sciences par divers savants et lus dans ses assemblées,* 11 v., Paris, Imprimerie Royale, 1750–1786.

[22] *Ibid.* **5**: 12. "Mémoire sur la théorie de la comète de 1759."

[23] *Ibid.* **5**: xix.

[24] MEM AC SCI 1765: 396–397.

[25] *Ibid.* 1765: 396–410.

[26] HIST AC SCI 1760: 113.

[27] "Transits of Venus at a given node occur either in pairs eight years apart or singly; the interval between single transits or the midway dates of pairs is 243 years, and transits occur at the other node about halfway between them. The first authentically observed transit was one of Venus, which occurred in 1639. . . . Four later transits of Venus have been observed, the last one in 1882; but the next will not occur until the year

infinite importance to the scientists, who expected, through data gathered in its observation, to measure more accurately the parallax of the sun, and hence its distance. The *Histoire* of the Academy of Sciences from 1757 onward is filled with remarks concerning this event and details of planning for coordinated observations. The abbé Chappe d'Auteroche was sent off with special equipment to Tobolsk in Siberia; Pingré, to the Ile Rodrigue in the Indian Ocean; Lemonnier and La Condamine observed in the presence of the King at Saint-Hubert; Maraldi, at the Observatoire; the Cardinal de Luynes, at Sens; Lacaille, at Conflans; Lalande, at the Luxembourg Palace; Fouchy, at the Cabinet de Physique at La Muette in Passy; and these observations were coordinated with some dozen others in France and as many more in Sweden, Denmark, Norway, Poland, Hungary, Spain, England, and Austria.[28] The magnitude of this international operation does credit to the age. "Jamais peut-être phénomène astronomique n'a été attendu avec autant d'impatience, ni observé avec autant de soin que celui-ci." [29]

Bailly is mentioned in Lacaille's official report [30] of which the following are extracts:

Le 3 juin, je fis transporter par eau tous les instruments nécessaires, savoir, un quart de cercle de deux pieds de rayon, une pendule à secondes, une machine parallactique et des lunettes de différentes grandeurs. M. Bailly, connu à l'Académie par son goût pour l'astronomie, voulut bien rester dans cette maison (i.e. at Conflans) pour prendre les hauteurs correspondantes du soleil, afin d'avoir l'heure vraie à l'horloge, le devoir de ma profession ne me permettant pas de m'absenter pendant plusieurs jours de suite. Le 5 à 3 heures du soir, je me rendis à Conflans. Le temps était presque toujours couvert; je pris une hauteur du soleil, laquelle étant comparée à sa correspondante prise le lendemain me donna l'instant du minuit vrai du 5 au 6 juin. M. Bailly avait déterminé celui du midi vrai le 4 juin; le 6, je pris matin et soir plusieurs hauteurs correspondantes qui me donnèrent le midi vrai, en sorte que je fus parfaitement assuré de l'état de ma pendule, pour réduire les moments observés aux temps vrais.

Lacaille used a telescope 4 ft. 9½ in. long with objective and double eye-piece especially designed and sent from England by Dollond, to which Lacaille added a micrometer for measuring the apparent diameter of Venus and Venus' progress across the surface of the sun. He concludes his account with this remark:

La sortie totale m'a paru à 8h 47m 6½s . . . M. Turgot de Brucourt (a third observer at Conflans) a jugé . . . la sortie totale 20 secondes avant; il se servait d'une lunette de 12 pieds, qui était assez difficile à manier à cause de l'incommodité du lieu; d'ailleurs sa vue était un peu fatiguée. M. Bailly . . . estima la fin 3 à 5 secondes après moi, avec une lunette de près de 6 pieds. . . .

If Bailly's observations did nothing more than confirm Lacaille's, they confirmed Bailly's position as an observer and made him one of the eminent group of astronomers who had participated. Eight years later and an old hand at it, Bailly observed the next transit of Venus with Fouchy and de Bory.[31]

In September of 1761 Bailly was back at his window in the Louvre and busy with the oppositions of Jupiter (September 21) and Saturn (September 30).[32] Shortly thereafter he must have begun his calculation on the satellites of Jupiter, inspired by Clairaut's solution of the problem of three bodies and his theory of the moon, for he read his first report on the subject before the Academy of Sciences on March 27, 1762. In April, 1762, he observed another opposition of Mars. On May 17 a new comet was observed by Klinkenberg [33] at the Hague. "Aussitôt qu'on fut informé de son apparition, MM. Maraldi, de Lalande, Bailly et Messier la cherchèrent et la comparèrent aux étoiles les plus voisines." [34] Lalande, in his "Mémoire sur la comète de 1762," [35] implies that he and Bailly first observed the comet about the same time—"le 29 mai au matin." This is obviously an error, however, as Bailly, in his own report on the comet presented to the Academy of Sciences on June 26, writes:

Je ne fus instruit de son apparition que le 2 juin, par l'avis inséré dans la *Gazette de France* du même jour. Le lendemain je ne pus l'observer, n'ayant pas de commodité alors pour placer d'une manière solide ma machine parallactique du côté du nord. Je commençai à l'observer le 4 et les jours suivants; je n'ai pas pu en faire un plus grand nombre d'observations, à cause de plusieurs nuits où le temps a été couvert, et encore plus à cause de l'incommodité de ma position, qui ne me permettait de voir la comète que depuis 10 heures du soir jusqu'à 11½, qu'elle se cachait derrière les bâtiments dont je suis entouré du côté du nord; et sur la fin de son apparition, qu'elle descendait beaucoup en s'éloignant du pôle boréal, je ne la voyais que pendant fort peu de temps, et lorsque le ciel se couvrait dans ce court intervalle, il fallait, pour ce soir-là, renoncer à observer la comète.[36]

Despite these difficulties Bailly proceeded to an independent determination of the comet's path. His statement of principles is significant both in the matter of his seriousness as an astronomer and in resolving the question whether he was more of an observer or a theorist.

C'est sur ces observations que j'ai établi les éléments de la théorie de la comète; j'aurais pu en trouver dont les temps auraient été plus distants, mais j'ai préféré de me servir des miennes seules, parce que 1°. elles m'ont paru dans des circonstances suffisamment favorables pour cela; 2°. parce que je crois qu'un astronome (toutes choses égales d'ailleurs) doit établir ses théories sur ses propres

2004." John Charles Duncan, *Astronomy* (4th ed.), 263–264, New York, Harper & Brothers, 1946.

[28] HIST AC SCI 1761: 98–117.

[29] *Ibid.* 1761: 98.

[30] MEM AC SCI 1761: 78–81.

[31] See *infra* page 448.

[32] MEM AC SCI 1765: 402–407.

[33] Dirk Klinkenberg (1709–1799), astronomer to the Dutch government and corresponding member of the Academy of Sciences.

[34] HIST AC SCI 1762: 125.

[35] MEM AC SCI 1762: 562.

[36] *Ibid.* 1762: 229.

observations. Il est clair que connaissant la manière dont elles ont été faites, il est en état d'apprécier leur exactitude et de choisir celles qui peuvent donner plus de précision à la théorie qu'il cherche.[37]

On the basis of observations made between June 4 and June 25 Bailly determined the inclination of the orbit of the comet, the location of its node, the location and distance of its perihelion. On June 26 he presented this information to the Academy of Sciences.

In October, 1762, Bailly observed another opposition of Saturn[38] and on December 2 he presented to the Academy his second paper on the satellites of Jupiter.[39] Three learned papers, participation in the observation and calculation of two major astronomical events (the return of Halley's comet and the transit of Venus), and the patronage of Lacaille and Clairaut, two of the most highly esteemed astronomers of the day, won for Bailly at the age of twenty-six a chair in the Academy of Sciences, which he occupied early in 1763.[40]

Early the same year, perhaps as his maiden speech as an academician, he prepared a short but valuable paper entitled "Mémoire sur les époques des mouvements de la lune sur la fin du siècle passé." The work was not a piece of original thinking so much as a labor of love. Clairaut, d'Alembert, and Euler, working separately and together from 1747 on, had attacked the problem of the motion of three mutually attracting bodies and had succeeded in making the apparent irregularities of the moon's behavior (the movement of the apogee, the regression of the nodes, and the varying range of declination) conform to their solution of the problem. But there were still discrepancies between the theory and observed fact. Mayer[41] and Clairaut tried to correct the theory by increasing the number of observations on which it was based.[42] Bailly performed a useful service by reducing a series of lunar observations made in the seventeenth century. It was necessary to choose observations made at a fairly distant date and yet not so antique as to be susceptible to gross error. The 42 observations used by Bailly were made by La Hire between July, 1683, and July, 1685. La Hire[43] was highly esteemed as a careful and accurate observer. As most of these observations were made in relation to given stars, Bailly was able to check the positions of the stars against Lacaille's tables and thus determine the errors of La Hire's instrument. He then corrected La Hire's observations for parallax according to Clairaut's tables of 1754. Having twice revised La Hire's observations, he then compared them with Mayer's and Clairaut's calculations. His somewhat tentative conclusion from this investigation was that the movement of the moon's apogee was slightly faster than that proposed by Mayer. The paper ends modestly enough, as befitting the work of a novice:

Quand même les observations, dont j'ai l'honneur d'offrir les réductions à l'Académie, ne paraîtraient pas suffisantes pour établir les époques, comme je me le suis proposé, je crois cependant rendre service à ceux qui travaillent à la composition ou à la vérification des tables de la lune, de leur donner un assez bon nombre d'observations, qui peuvent passer pour déjà anciennes, réduites avec toute la précision dont elles sont susceptibles, ce qui a paru manquer jusqu'ici.[44]

On February 23, Bailly reread his "Mémoire sur la comète de 1762," to which Grandjean de Fouchy[45] added the following gloss:

M. Bailly a calculé une table des lieux de la comète et les a comparés aux lieux observés; l'erreur moyenne n'est guère que de 3′ et aucun des lieux calculés ne s'éloigne des observations plus que de 5′½, exactitude plus que suffisante pour mettre un jour les astronomes à portée de reconnaître cette comète lorsqu'elle reviendra à reparaître. Lorsqu'à la fin du siècle dernier, et même au commencement de celui-ci, on regardait encore les comètes comme des météores et des signes de la colère céleste, on était bien éloigné de penser qu'on touchait au moment de calculer leurs mouvements avec tant d'exactitude.[46]

On March 9, Bailly reread his first "Mémoire sur la théorie des satellites de Jupiter"; on May 4, the second. Sometime toward the end of the same year[47] he read the third and last report in this series. These first three reports constitute the groundwork for Bailly's later *Essai sur la théorie des satellites de Jupiter* (1766) and his major preoccupation for the decade ending in 1771. Arago says of this work:

Le sujet était heureusement choisi. En l'étudiant dans toute sa généralité, notre confrère se montra à la fois calculateur infatigable, géomètre pénétrant, observateur industrieux et habile. Les recherches de Bailly touchant les satellites de Jupiter seront toujours son premier, son principal titre de gloire scientifique. Avant lui, les Maraldi, les Bradley, les Wargentin découvrirent empiriquement

[37] *Ibid.* 1763: 232–233.

[38] *Ibid.* 1765: 408–409.

[39] *Ibid.* 1763: 172–189.

[40] According to the most official source, *Les Membres et les correspondants de l'Académie royale des Sciences (1666–1793)*, 12, Paris, à l'Institut, 1931, Bailly was elected April 27, 1763. But Lalande (Eloge, 322) gives January 29, 1763. Arago (2: 259) and Fernand-Laurent (54) accept Lalande's date. I am inclined to do the same, because Bailly reread several papers in February and March of that year, and it is difficult to see why he should have done so unless his status had changed. Bailly was named *adjoint-astronome* replacing Guillaume-Joseph Legentil de la Galaisière (1725–1792) who became *associé*.

[41] Johann Tobias Mayer (1723–1762), astronomer of Göttingen.

[42] Mayer in *Commentaria Societatis regiae Gottingensis* 2: 383 ff.: Clairaut in *Tables de la lune*, 1754.

[43] Philippe de La Hire (1640–1718), mathematician and collaborator with the abbé Picard (1620–1682). Together they undertook to make the first scientific map of France.

[44] MEM AC SCI 1763: 24.

[45] Jean-Paul Grandjean de Fouchy (1707–1788), Secrétaire perpétuel of the Academy of Sciences.

[46] HIST AC SCI 1763: 80.

[47] The last observation recorded in this report is September 3.

quelques-unes des principales perturbations que ces astres subissent dans leurs mouvements de révolution autour de la puissante planète qui les maîtrise; mais on ne les avait pas rattachées aux principes de l'attraction universelle. L'honneur de l'initiative appartient, sur ce point, à Bailly.[48]

It must be remembered, of course, that when this homage was paid Bailly in 1844, eighty-one years after the publication of his three reports, the scientific world still knew only the four largest and brightest of Jupiter's satellites which Galileo had discovered in 1610.[49]

Galileo had appreciated the value of observations of these satellites for the exact determination of longitude,[50] and the Netherlands government was prepared to subsidize his research when his blindness put an end to the project. After his death, Peiresc, Morin, Reyneri, Hodierna, Marius, Hevelius, Borelli, and others continued his observations and tried unsuccessfully to devise periodic tables of the satellites. Ultimately it was Cassini [51] who was the first to make any real progress. His *Ephémérides des satellites de Jupiter* appeared in 1668. Cassini devoted many years to the study of the satellites, during which time he determined their periods and the irregularities in those periods caused by the eccentricity of Jupiter's orbit and by the inclinations of the satellites' orbits. He discovered the rotation of the satellites. By measuring their orbits, he discovered that Kepler's Harmonic Law [52] applies equally to a planet and its satellites. He observed that their eclipses advanced from conjunction to opposition and retarded from opposition to conjunction, a discovery which made possible Römer's determination of the velocity of light. In short, by a purely empirical method, he indicated that the movements of Jupiter's satellites were obedient to some sort of natural law and therefore predictable. Bradley,[53] the two Maraldis,[54] and Wargentin [55] determined the eccentricities of the satellites' orbits, the inclinations of their orbits, the rate of change of inclination, and the movement of their nodes. Finally Lalande had pointed out that Jupiter's shape—a spheroid flattened at the poles—casting an eliptical shadow, added another factor to be allowed for in the timing of eclipses.

But all these astronomers worked from the observed phenomenon. Bailly was the first to attempt a theoretical explanation of the satellites' behavior, to derive a formula with which the observations would agree.

Je crois être le premier qui aie tenté d'appliquer la géométrie à la théorie des satellites de Jupiter. Newton avait apprécié quels devaient être la variation, le mouvement de l'apside et des nœuds, et il en avait fait l'application au quatrième; mais dans ce calcul il ne considérait que les perturbations du soleil. D'ailleurs il n'y a pas fait entrer l'excentricité du satellite, qui produit une équation assez sensible. L'envie de m'instruire et d'être utile en m'exerçant me fit concevoir le projet de déterminer les inégalités de Jupiter, en supposant toutes les causes de perturbations que l'on peut soupçonner.[56]

The perfection of a theory of Jupiter's satellites offered an immediate practical application. As noted above, the observation of the satellites had been a favorite device throughout the seventeenth century for determining longitude. For this purpose it was sufficient to make simultaneous observations of a given phenomenon (the beginning or end of an eclipse) in two places, the longitude of one being known; the difference in time gave the difference in longitude. It was not necessary to predict the phenomenon with any great accuracy. If, however, the occurrence of the phenomenon could be predicted, one observation correlated with the time would give an exact longitude without reference to any other observation. This knowledge, together with Dollond's telescope,[57] would make the observation of Jupiter's satellites a useful aid to navigation.

The moon had offered the mathematicians the most tangible manifestation of the mutual attraction of three bodies. As we have seen, Clairaut, d'Alembert, and

[48] Arago 2: 260.

[49] The four "Galilean" satellites are all of the 5th and 6th stellar magnitudes. None of the others is greater than the 13th magnitude. Jupiter V was discovered only in 1892.

[50] Jupiter may be observed ten months out of the year, and the almost daily occurrence of Jovian eclipses makes possible continuous observations. Longitude calculations had previously been based on observation of lunar or solar eclipses, too rare and too susceptible to error for extensive cartography. Picard and La Hire used the satellites of Jupiter to rectify the map of France, eliciting from Louis XIV the comment that "il payait bien son Académie pour resserrer les limites de ses possessions." (SAT JUP, xxiii.)

[51] Giovanni Domenico (called Jean-Dominique) Cassini (1625–1712), organizer of the Observatoire and one of France's greatest astronomers.

[52] That the cubes of the mean distance of any two planets from the sun are to each other as the squares of their periodic times.

[53] James Bradley (1692–1762), third English Astronomer Royal.

[54] Jacques-Philippe Maraldi (1665–1729), nephew of Cassini, and Jean-Dominique Maraldi (1709–1788), nephew of the above.

[55] Pehr Wilhelm Wargentin (1717–1783), secretary of the Academy of Sciences at Stockholm and corresponding member of the Academy of Sciences at Paris. His writings on Jupiter and its satellites include: *Diss. de Satellitibus Jovis*, Upsala, 1751; "Tabulae pro calculandis eclipsibus satellitum Jovis" in *Acta Societatis Regiae Scientarium Upsaliensis* 2, 1746; "Observationes macularum varii generis in disco Jovis et conjunctionum inferiorum satellitum ejus" in *Nova Acta Societatis . . . Upsaliensis* 2, 1775; "Undersökn, om de ojemnheiter, som planeten Jupiters månar, medelst sina inbördes attractions Krafter, förorsaka i hvarandras gång" in *Svenska Vetenskapsakademien Handlingar*, 1748; and "A New Method of determining the longitude of places from observation of the eclipse of Jupiter's satellites" in *Philosophical Transactions* of the Royal Society, 1766.

[56] SAT JUP, [iii].

[57] John Dollond (1706–1761), English optician, inventor of the double (achromatic) lens, had produced a telescope with a double eyepiece which permitted the use of a short tube without loss of magnification. It was such an instrument that Lacaille used to observe the transit of Venus in 1761. (MEM AC SCI 1761: 80.)

Euler had all attacked the problem and reached an approximate solution. A modern authority, commenting on the complexity of this work, says:

> The problem of three mutually attracting bodies is just as determinate as that of two—that is, a given set of initial conditions leads as certainly to a definite result; but the problem is of such difficulty and complexity that only in special cases is even the most powerful of modern analysis capable of producing formulas by which this result can be computed.[58]

Undismayed, Bailly determined to solve what he called "le problème des cinq corps, ou même des six, en y admettant le soleil."[59] He might have made it seven, for his calculations included the attraction exerted by Saturn.

> Je me suis donc livré à cette discussion, sans autre secours que les livres de Newton, les principes de M. Clairaut, beaucoup d'observations que M. Maraldi a bien voulu me communiquer, et la patience nécessaire pour découvrir la vérité enveloppée dans une immensité de calculs pénibles. J'ai préféré la solution de M. Clairaut, parce qu'étant mon ami, nous l'avions lue ensemble, et qu'il était à portée de m'aider de ses avis pour surmonter les obstacles qui pouvaient se présenter.[60]

Bailly initially excluded the mutual attractions of the satellites, dealing with each one separately as though it were the sole moon of Jupiter and thus obedient to the laws determined by Clairaut for the earth's satellite. In the first *mémoire* he considered the perturbation of each satellite caused by the sun's attraction. The most curious result of this investigation was that Bailly's formula gave the nodes of the fourth satellite a retrograde motion of 5′ 12″ annually, whereas observation showed a direct motion of exactly the same amount. Lalande had demonstrated[61] that the movement of the nodes of a perturbed satellite, which was retrograde on the orbit of the perturbing satellite, might appear direct on the orbit of the principal planet. Bailly judged therefore that there was no basic contradiction between his formula and the observed phenomenon.

The second *mémoire* was devoted to a consideration of the *figure* of Jupiter, the eccentricity of its orbit and the inclination of the orbit of each satellite to the main orbit. These computations gave the equation for the movement of the line of apsides of each satellite. Here again the formula was at some variance with the observed fact. (For example, the theory showed an annual movement of 5° 5′ for the apsides of the third satellite; Maraldi's observations showed only 1° 30′.)

The third *mémoire* undertook to consider the satellites two by two in relation to the main planet, regarding one as the perturbed and one as the perturbing. As a basis for this work, Bailly used Wargentin's tables for the second satellite, which came closest to the results of observation and therefore permitted the assumption that this was the stablest of the satellites. Here it was essential to know the mass of each satellite, and much of the last report is approximation or frank speculation. Nevertheless, in an appended table of 56 observations, with Wargentin's and his own tables set out in parallel columns, Bailly's figures show the smaller margin of error, and Fouchy wrote of the three reports: " . . . tout cela, comme on voit, exige la fin du travail de M. Bailly sur cet article; ce qu'il a déjà fait est un sûr garant du soin avec lequel il se prêtera à satisfaire sur ce sujet l'impatience du public astronome."[62]

Bailly's friend and teacher Lacaille died in March of 1762, leaving the unfinished manuscript of the sixth volume of his *Ephémérides des mouvements célestes . . . pour le méridien de Paris.* Most of the work for this volume must have been completed before his death, for the textual comments are for the most part written in the first person, and the two *approbations* are dated November 22, 1760, and February 8, 1761. It is clear, however, that Bailly had helped with the compilation of the tables, the first of which is "Des vrais lieux de la lune calculés sur les observations de M. de La Hire faites à l'Observatoire de Paris."[63] This is the same work on which Bailly reported to the Academy in the paper entitled "Mémoire sur les époques des mouvements de la lune sur la fin du siècle passé," and Lacaille credits it to him:

> Ayant remis les résultats de ce travail à M. Bailly, Garde en survivance des tableaux du Roi, fort instruit et fort curieux de l'astronomie, il s'en est servi pour construire la première table suivante, où il n'a rien négligé pour lui donner toute l'exactitude possible.[64]

It seems likely that it was Bailly who undertook to complete this volume for publication; it is certain that he reduced the observations of the zodiacal stars, and the remarks on the star catalogues are probably written by him. The work of reduction was an extremely important and tedious one.

> Le second catalogue contient 515 étoiles zodiacales que M. l'abbé de Lacaille a observé [*sic*] depuis le mois de septembre 1760 jusqu'au commencement de mars 1762; il comptait le composer de 800 étoiles, mais la mort l'a enlevé avant que cet ouvrage ait été terminé. . . . Les positions apparentes de ces étoiles ont été réduites à leurs positions vraies pour le 1 janvier 1765, par les petites équations de la précession, de l'aberration et de la nutation.[65]

Lacaille, in his introductory remarks, had already paid unwitting tribute to his pupil:

[58] Duncan, *Astronomy*, 245, New York, Harper & Brothers, 1946.

[59] SAT JUP, v.

[60] *Ibid.*, vii.

[61] HIST AC SCI 1761: 134 and MEM AC SCI 1762: 230.

[62] HIST AC SCI 1763: 76–77.

[63] *Ephémérides* **6**: lii.

[64] *Ibid.* **6**: li.

[65] *Ibid.* **6**: lxxviii. The catalogue is entitled "Catalogue des 515 étoiles zodiacales observées en 1760 et 1761 par M. l'abbé de Lacaille, et réduites au commencement de l'année 1765 par M. Bailly, de l'Académie royale des Sciences."

Ceux qui pratiquaient l'astronomie il y a 25 ans savent qu'après l'observation d'une étoile et celle de la lune dans le méridien, qui n'exigent chacune que deux ou trois minutes de temps, il ne fallait alors guère plus d'une demi-heure de calcul pour en conclure la longitude et la latitude véritables de la lune. A présent deux heures suffisent à peine à celui qui est le plus exercé dans les réductions astronomiques. On ne doit pas juger du travail d'un astronome par le nombre des observations qu'il a faites, mais par celui des observations qu'il a réduites, pour en faire usage et pour mettre les autres en état de les employer utilement aux progrès de nos connaissances.[66]

Jérôme Lalande pointed out some years later that 132 of the 515 zodiacal stars had not previously been recorded in star catalogues, and added his tribute to Bailly's labors: "Ainsi Bailly rendit service à l'astronomie, en nous faisant jouir d'un travail qui avait coûté la vie à son auteur, et qui serait demeuré inutile sans le zèle de son élève." [67] The *Ephémérides* appeared in 1763, without mention of Bailly's name on the title-page.

In March and April of 1764 Bailly was in Sens to observe the lunar and solar eclipses with the Cardinal de Luynes.[68] Their observatory was the Archbishops' *maison de plaisance* at Noslon, where the Cardinal used a *machine parallactique* [69] on the ground floor; and Bailly, an ordinary 9 ft. telescope on the upper story. March 15, 16, and 17 were spent in vertifying the time. The lunar eclipse began at 10:53 P.M. on March 17. The Cardinal suffered a mishap which cut short his observation at 11:30, but Bailly was able to observe continuously until 1:03 A.M., when the sky became overcast. The following entries in Bailly's log give some idea of his technique as an observer: [70]

10 h	48 m	12 s	il y a un peu de pénombre.
10	50	12	la pénombre est très apparente.
10	52	12	l'éclipse paraît commencée.
10	52	52	l'éclipse est certainement commencée.
10	59	12	un doigt.[71]
11	8	42	l'ombre à Tycho.
11	9	57	Tycho est entré.
11	12	22	Grimaldi est entré.
11	17	57	quatre doigts. L'ombre est si peu obscure qu'on voit encore Grimaldi.
11	25	22	cinq doigts. On voit toujours Grimaldi.
11	26	0	l'ombre à Galilée.
11	27	12	Galilée est entré sans disparaître. Je ne vois plus Grimaldi.
11	34	32	six doigts.
11	46	42	sept doigts.
11	53	42	l'ombre à Manilius.
11	55	52	Manilius est entré.
12	0	12	huit doigts.
12	4	47	Pline est entré.
12	20	12	tout Mare Crisium.
12	20	12	Galilée est sorti.
12	24	0	Je revois Grimaldi.
12	27	27	Grimaldi commence à sortir.
12	28	12	il est sorti.
12	44	17	sept doigts. nuages blancs.
12	56	0	six doigts.
13	3	0	le temps est tout à fait couvert.

The solar eclipse of April 1 was an event of considerable importance. It was known that the eclipse would be annular over a large part of France and England, but different tables of the sun and moon indicated slightly different paths for the eclipse. Mayer's and Lalande's tables showed annularity in England and Normandy, but not in Paris. Cassini de Thury, Clairaut, and d'Alembert predicted annularity in Paris. Opinion was divided in the Academy, and there was some impatience to learn which tables would be proved to be correct. As it turned out, the Paris observers got no first-hand answer to the question, because it rained the whole day in that city. Bailly and the Cardinal had slightly better luck. Although the weather did not permit them to view all the phases of the eclipse or make any precise measurements, for a brief moment the Cardinal was able to observe a complete ring of light around the darkened disc of the moon. This observation established the fact that Sens was at the extreme limit of the path of annularity, and, by comparing the results of observations in London and elsewhere, Bailly was able to correct Clairaut's tables.

The results of the April eclipse expedition were communicated to the Academy in two *mémoires* of May 2 and August 4, 1764. The results of the lunar eclipse of March 17 served also to verify the longitude of the observatory at Polling in Saxony, Bailly having been asked to compare the times of his observations with those made in Germany.[72]

December 19, 1764, Bailly read before the Academy a sort of *état présent* of his observations, entitled "Observations faites aux Galeries du Louvre depuis 1760 jusqu'en 1764." It is here that we learn the details of the *incommodités* of his observatory and something about the equipment he used.

[66] *Ibid.* **6**: xlvii–xlviii.

[67] Eloge, 322.

[68] Paul d'Albert de Luynes (1703–1788), Bishop of Bayeux, Archbishop of Sens and Cardinal, was a member of the Académie française and an honorary member of the Académie des Sciences, which published the results of many of his astronomical observations. He was the younger brother of Charles-Philippe, Duc de Luynes et de Chevreuse.

[69] *Machine parallactique* as used by the eighteenth-century astronomers would appear to mean a telescope with an equatorial mounting. Thus Bailly says of the solar eclipse of April 1: "La difficulté de suivre le soleil . . . m'empêchait de profiter de tous les instants, parce que souvent le soleil était rentré dans les nuages avant que j'eusse pu y pointer ma lunette; au lieu que Son Eminence qui observait avec une machine parallactique était dans le cas de ne jamais quitter le soleil dont la lunette suivait le mouvement journalier." (MEM AC SCI 1764: 280.)

[70] These are taken from "Observations astronomiques faites à Noslon, maison de plaisance des Archevêques de Sens par S. E. Mgr le Cardinal de Luynes et par M. Bailly" in MEM AC SCI 1764: 277–281.

[71] The *doigt* (*digit* in English) is an obsolete measure equal to 1/12 the diameter of the sun or the moon.

[72] "Mémoire sur la longitude de Polling" in MEM AC SCI 1764: 339–343.

L'instrument des passages,[73] que j'ai fait faire au sieur Cannivet, est composé d'une lunette de quatre pieds, portée sur un axe de deux, mobile sur deux supports, dont l'un porte dans une entaille faite au mur, et l'autre est appuyé sur une pierre de taille de quatre pieds de hauteur, solidement scellée dans le plancher. Il est très parfaitement de niveau, car il donne, à très peu près, la même erreur sur le passage au méridien, à différentes hauteurs. Le sextant, ainsi qu'un quart-de-cercle de trois pieds de rayon, m'ont été remis par M. de Thury.[74] Je me sers de ce sextant comme d'un quart-de-cercle, mais l'arc de ce sextant, lorsque M. de Thury me le remit, n'avait que 52 degrés environ. Il n'aurait pas pu me servir pour observer les hauteurs méridiennes plus grandes; j'y ai fait ajouter par le sieur Cannivet un arc de 15 degrés, ce qui lui donne actuellement 67 degrés d'amplitude; cette allonge est si adroitement et si solidement appliquée qu'il est difficile de s'apercevoir de la jonction, et les règles de champ et les branches de fer qui le soutiennent rendent cette partie de l'arc aussi solide que le reste. Les autres instruments que je possède sont une pendule du sieur Lepaute[75] et une machine parallactique du sieur Cannivet.[76]

According to Lalande[77] it was in 1764 that the Academy announced the subject of its prize for 1766:

Quelles sont les inégalités qui doivent s'observer dans le mouvement des quatre satellites de Jupiter, à cause de leurs attractions mutuelles? La loi et les périodes de ces inégalités, surtout au temps de leurs éclipses, et la quantité de ces inégalités suivant les meilleures observations? Les changements qui paraissent avoir lieu dans les inclinaisons des orbites des 2e et 3e satellites doivent surtout être compris dans l'examen de leurs inégalités.[78]

Many of the astronomer academicians had worked on this problem, but undoubtedly Bailly's three reports of 1762 and 1763 had helped stimulate interest in this still virgin field. Now Bailly found himself in competition with some of the most celebrated astronomers of Europe. Forced to choose between abandoning his own research or accepting the challenge of such competition, Bailly courageously picked the latter course.

Je me suis rassuré en songeant que j'avais comme eux le motif d'être utile, et qu'en leur cédant sur l'élégance des moyens, mes vues ne pouvaient être blamables, puisqu'il n'était pas possible de les soupçonner de présomption.[79] Mais il fallait donner mes résultats avant que les pièces qui devaient concourir au prix fussent arrivées. Le temps était très court, et mes lumières sont si faibles que je ne regarde l'ouvrage que je présente aujourd'hui au public que comme l'ébauche de cette matière importante.[80]

For two years Bailly devoted himself entirely to the problem of Jupiter's satellites. The results were communicated in two papers[81] and a 144 page quarto volume which appeared early in 1766[82] entitled *Essai sur la théorie des satellites de Jupiter.*

In his paper of April 30, 1765, Bailly returned to the problem which had turned up in his very first essay on the satellites—that of the movement of the nodes. Maraldi the elder had observed in the nodes of the second satellite a libration of 10°, i.e. a period of direct motion followed by a period of retrograde motion. He had ascribed it to a variation in the inclination of the satellite's orbit. By spherical trigonometry Bailly was able to elaborate this explanation and show that the change in direction of the nodes of the perturbed satellite was coincident with the conjunction of the nodes of the perturbed and perturbing satellites and that the period of variation of the inclination corresponded to the period of revolution of the nodes. Maraldi, the nephew, paid tribute to Bailly for this discovery:

. . . il me fit l'honneur de me dire au mois de mars dernier qu'il trouvait que l'on représentait beaucoup mieux les observations en admettant ce mouvement. Je fus fort satisfait de m'être rencontré avec lui, et je l'assurai que non seulement la théorie m'avait indiqué ce mouvement, mais que l'accord des observations m'en avait aussi prouvé la réalité.[83]

Bailly commences the *Essai* of 1766 with a fifty-three page historical introduction—"car dès lors la partie de l'érudition paraissait l'intéresser."[84] In it he traces the progress of knowledge of the satellites from Galileo to his contemporaries, Maraldi and Wargentin. The text proper is divided into four parts: (1) perturbations caused by the sun and by Saturn; (2) the mutual attraction of Jupiter's satellites; (3) the masses of the satellites; and (4) the movement of the nodes and variation in the inclinations of the orbits of the satellites. Although much of the material had been presented previously before the Academy, the book is not in any way a reprint. Bailly was breaking new ground, and it is not surprising that he occasionally got lost. His greatest difficulty, for example, was in determining the relative masses of the satellites. A first calculation, based on Wargentin's empirical equation for the first satellite, ended in minus quantities. A second calculation, based on the movement of the nodes, tripled Wargentin's equation for the second satellite. Clearly there were factors involved which were beyond the grasp of the eighteenth century theorist.

[73] *Instrument des passages:* a meridian circle or transit instrument.

[74] César-François Cassini de Thury (1714–1784), grandson of the famous Cassini, director of the Observatoire, cartographer of the map of France which bears his name, member of the Academy of Sciences.

[75] Jean-André Lepaute (1709–1789), famous Paris horologist.

[76] MEM AC SCI 1765: 397.

[77] Eloge, 323; elsewhere Bailly says April, 1764.

[78] HIST AC SCI 1766: 165.

[79] Bailly, as a member of the Academy, could not qualify for the prize.

[80] SAT JUP, iv.

[81] "Mémoire sur la cause de la variation de l'inclinaison de l'orbite du second satellite de Jupiter," 1765, and "Mémoire sur le mouvement des nœuds et sur la variation de l'inclinaison des satellites de Jupiter," 1766.

[82] The *privilège* is dated February 8, 1766.

[83] MEM AC SCI 1765: 504.

[84] Lalande, Eloge, 323.

Lagrange [85] who won the Academy's prize in 1766 offered a theory which more nearly approached the observed fact. This may explain Bailly's attitude towards him—an attitude at once deferential and slightly patronizing:

> Si nos recherches nous avaient fait entrer précédemment dans cette carrière, nous ne prétendons point, dans le compte que nous allons rendre ici, nous placer à côté de ce grand géomètre. . . . Il a pris la question sous le point de vue le plus général; il a vu les quatre satellites se déranger à la fois; il a tenu compte de toutes ces altérations et de leur complication; enfin il a résolu le problème des cinq corps. Si cette considération n'a point fait connaître de nouvelles inégalités dans les mouvements des satellites, il était essentiel d'être assuré qu'elle n'y changeait rien. Le coup d'œil qui embrasse tout ce qui tient à la question donne le dernier degré de confiance à une solution d'ailleurs élégante et profonde.[86]

Delambre, the nineteenth century astronomer-historian, puts the two in proper perspective:

> Lagrange . . . avait mieux réussi que Bailly, qui, dans son *Essai*, était d'abord arrivé à des masses beaucoup trop inexactes, qu'il a corrigées depuis.[87] . . . On voit que l'*Essai* de Bailly n'était pas sans mérite; il expliquait les principales inégalités que l'observation avait rendues sensibles; et si le problème était réellement au-dessus de ses forces, on peut lui appliquer ce qu'Ovide a dit de Phaéton: *Magnis tamen excidit ausis.*[88]

Both Bailly and Lagrange promised their readers more research on the masses of the satellites, but Bailly never really tackled the problem again, and it was twenty-four years—after Laplace had superseded him—before Lagrange had anything more to say on the subject.

Bailly appended to his *Essai* Jeaurat's [89] tables of the movements of Jupiter and his own tables for the movement of the four satellites. Unfortunately, these were calculated not in time, but in signs and degrees, and were less easy to use than the older tables of Wargentin, which continued to be used by astronomers until the third edition of Lalande's *Traité d'astronomie* appeared in 1792 with revised tables by Delambre. "Les tables de Bailly, comme celles de Wargentin, reposaient sur une théorie imparfaite de Jupiter: de là quelques erreurs qu'il serait injuste de leur reprocher." [90]

Whatever may be, by modern standards, the inaccuracies of his work on the satellites of Jupiter, it is clear that none of Bailly's biographers has fully appreciated his contributions to the field of science. Bailly was not a great thinker or the discoverer of new concepts; no case can be made for placing his name beside those of Newton, Leibnitz, and Laplace. But he should not be denied a niche among the numerous competent and persevering work-a-day scientists who, perhaps, in the long run make possible the achievements of a few great men. His observations and reductions, his application of a mathematical discipline to the movements of the heavenly bodies, and his detailed publications had brought him, by 1766, considerable credit among fellow scientists.

But Bailly was also something of an innovator. As Arago has pointed out, it was his initiative which first applied the Newtonian principle of attraction to the satellites of Jupiter. Newton had suggested the idea, but no one before Bailly [91] had undertaken the formidable task of providing a set of equations which would accurately describe the behavior of the satellites and make them subservient to Law. It has only been of recent years, with the aid of Einstein's theory and a slight modification of Newtonian principle, that Mercury's orbit has been made obedient to Law. How much more incredibly complex then was the task which Bailly set himself, and how much greater the credit that he deserves! Bailly's line of attack was the right one, even if the means at his disposal were inadequate.

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[85] Joseph-Louis Lagrange (1736–1813), professor of mathematics at Turin, later director of the Académie pour les sciences physico-mathématiques in Berlin, had previously (1764) won the Academy's prize for his theory of the librations of the moon.

[86] ASTR MOD 3: 177–179.

[87] In the "Mémoire sur le mouvement des nœuds et sur la variation de l'inclinaison des satellites de Jupiter," MEM AC SCI 1766: 346–364.

[88] *Histoire de l'astronomie au dix-huitième siècle,* 739–741. Delambre's judgment after the fact may be too severe. Maraldi acknowledged his indebtedness to Bailly's research and found his calculation "presque entièrement d'accord avec elle." (MEM AC SCI 1768: 298–331.) See also HIST AC SCI 1768: 91–93.

[89] Edmé-Sebastien Jeaurat (1724–1803), astronomer and for more than thirty years a member of the Academy, of which he liked to call himself the doyen. From 1776 to 1787 he was editor of the Academy's *Connaissance des Temps.*

[90] *Op. cit.,* 742.

[91] Wargentin and Elvius, in the *Handlingar* of the Svenska Vetenskapsakademien, 1748, Walmsley, in the *Philosophical Transactions* of the Royal Society, 1758, and Lalande, in MEM AC SCI, 1762, had offered empirical evidence for a theory of Jupiter's satellites. But Lagrange's *Recherches sur les inégalités des satellites de Jupiter,* which has generally been looked upon as the first major work of a theoretical nature, was not written until 1766 and was not published until 1777. Bailly's first articles, as we have seen, date from 1761 or early 1762. For Bailly's quarrel with Lalande on the priority of discovery, see infra, page 451.

II. LITERARY BEGINNINGS

The éloges of Charles V, Leibnitz, Corneille, Molière, and Lacaille

On dit que le Ciel nous inspire;
Mais c'est en parcourant les cieux
Que j'ai perdu pinceaux et lyre.

Bailly, "Réponse . . . aux vers par Mme la Duchesse. . . ."

Grandjean de Fouchy had been Secrétaire Perpétuel of the Academy of Sciences since 1743; he was old and ailing, in need of an assistant and—so his colleagues said—of a successor. About 1766 d'Alembert seems to have lighted on Bailly as a possible candidate.

> Bailly crut voir dans d'Alembert la même loyauté . . . qui lui rendait si chère la mémoire de l'abbé de Lacaille. . . . D'Alembert lui représenta que Fouchy ne pouvait pas garder encore longtemps la place qu'il occupait, mais qu'il occupait sans la remplir. Je ne vois que vous, lui dit-il, qui puissiez honorablement lui succéder; vous lui succéderez; je vous le promets; je m'y engage.[1]

Arago[2] adds that d'Alembert indicated, as the best possible preparation for the secretariat, the composition of biographies. Bailly took the advice of the famous mathematician and chose for his studies the *éloges* proposed by various academies. In the short space of two years he produced four—possibly five—such works.[3]

Whether Bailly embarked on the career of biographer purely from ambition and with the intent of becoming secretary of the Academy is not entirely clear. We have seen that before his entry into the Academy he had had a flirtation with *belles-lettres;* we know that he had never ceased to write bits of occasional poetry; and we have Lalande's testimony that "son goût pour la littérature le délassait de ses travaux astronomiques."[4] The *éloge* was much in vogue as a literary form at this period, particularly as the Académie Française had abandoned in 1758 its nearly century-old tradition of proposing only religious questions. Fontenelle had shown the possibilities of the *éloge* as a genre, and eloquence blossomed in this form throughout the second half of the century. For the first time, the Académie Française proposed for its prize in eloquence the life of a king when, in 1767, it announced the subject: Charles V. Called *the Wise,* victorious in war, and four centuries dead, Charles V seemed a safe subject for public discussion.[5]

Bailly's *Eloge de Charles V* is indeed a catalogue of all the favorable things that an obedient subject should say about a wise and good monarch, and as such it merited, if not the prize,[6] at least the praise of the Académie Française in its public session of August 25, 1767. The piety attributed to Charles was not calculated to antagonize the four doctors of theology whose duty it was to censor such works. But I am not prepared to agree with Arago's statement that "aucun trait ne décèle, ne fait même pressentir dans l'écrivain le futur président d'une assemblée nationale réformatrice, et surtout le maire de Paris au temps d'une effervescence révolutionnaire."[7] This remark is no doubt inspired by Bailly's treatment of the bourgeois revolt led by Marcel who is branded as "un maire insolent"[8] while his assassin is called "un citoyen fidèle."[9] Arago seems to regret that Bailly did not anticipate his own role in the Revolution. The fact of the matter is that Bailly's appreciation of Charles is not particularly profound and is often banal. Yet he is not primarily concerned with Charles' reign as such.

Under the veneer of historicity lies an eighteenth-century treatise on kingship and government which may not be original but is certainly in step with the philosophic movement. Bailly describes in detail the maladministration and corruption of the previous reign, the self-interest of the nobility and the economic havoc wrought by the *subsides.* It is as reformer rather than merely as a king that Charles V becomes worthy of an *éloge.* Above all he is the embodiment of the law and the symbol of the people's will. "Un roi . . . est la loi rendue vivante."[10] Bailly, in his most revolutionary hour, never lost his respect for the law, which he regarded as an extension of natural principles. The monarchical system was the compromise which human wisdom had devised between the excesses of anarchy and despotism. The monarch was the chief agent of the law. If the king could command all, it was because he was supposed to represent the sum total of the

[1] Mérard de Saint-Just, 28–29.
[2] *Op. cit.* **2**: 263.
[3] Lacretelle (Eloge, 1005–1006) refers to two additional *éloges* of Descartes and Clairaut. These are not mentioned by any other source, and Lacretelle furnishes no details.
[4] Eloge, 323.
[5] Charles V (1337–1380), son and successor of Jean. After the battle of Poitiers (1356) and during his father's captivity, Charles used the title *Lieutenant du roi.* The outbreak of the *Jacquerie,* the poverty arising from the war, the ravages of the English and the disloyalty of his own nobility made the regency a nightmare of disorder. After his father's death and his accession to the throne, however, Charles displayed great administrative ability in establishing domestic peace, and he was very nearly successful in expelling the English from French soil.
[6] Laharpe won the prize.
[7] *Op. cit.* **2**: 265.
[8] DISC MEM **1**: 6.
[9] *Ibid.* **1**: 9.
[10] *Ibid.* **1**: 3.

public will. If all were obliged to obey, it was "parce qu'ils se le sont proposé."[11] This cession of the rights of the populace to the will of an individual was thus a sacred pact which imposed upon the monarch the obligation to be just, good and enlightened. Here we have a political doctrine which is strong in its echoes of Montesquieu and Rousseau.

Elsewhere Bailly explains what he means by enlightenment. He is particularly concerned with the economic aspects of Charles' reign and analyzes in some detail his fiscal policies. Charles is praised for having retrieved the excessive gifts, in the form of land and *subsides,* with which his predecessors bought the support of the nobility. At the same time he saw to the equitable and efficient collection of taxes, which had long been a source of corruption and spoliation of the national treasury. Moreover, he practiced state economy in prosperous times and state spending in times of misfortune. Bailly is anxious to see the government economize, without drying up the wellsprings of royal generosity: "la sagesse décide le moment où l'économie devient une vertu."[12] Bailly realizes that intelligent government spending can create capital wealth and smoothe out the rough spots caused by alternate periods of scarcity and plenty. "L'impôt n'est jamais lourd lorsque, destiné aux dépenses de la nation, il reflue sur la nation même et s'en va nourrir la source dont il est sorti."[13]

In matters of money value, Bailly shows conservative instincts, defending large fortunes against the inroads of inflation. Charles, unlike his predecessors, avoided the imprudence of issuing cheap money—"ressource honteuse et momentanée."[14] Inflation, calculated to enable the state to meet its commitments, serves only to ruin the creditor for the benefit of the debtor; the poor become powerful, and the wealthy hoard their gold; commerce declines, and the public's faith is shaken.

Bailly praises Charles for his suppression of vice in the capital and for his exemplary conduct before the people (here, indeed, there may be an augury of Bailly's own policies as mayor); for his encouragement of agriculture, industry and commerce; for his interest in scholarship and learning.

> Il fonde cette bibliothèque aujourd'hui si fameuse et si magnifique.[15] Rois, n'oubliez pas qu'il y chercha la vérité! C'est là qu'elle existe pure et sans mélange: non dans l'histoire qui a divinisé les tyrans, qui a flétri de grands hommes, mais dans les écrits des sages de tous les siècles.[16]

Bailly points out that, in the regency which Charles provided for his successor, there was a council of state representing all the orders, "depuis les grands qui environnent le trône, depuis les ministres dépositaires des volontés du prince, jusqu'au simple citoyen qui n'a que son zèle et ses lumières."[17]

But Charles V was also a warrior king, and Bailly was not exactly a militarist: "Le fer est malheureusement l'arbitre des nations."[18] He justifies Charles' wars as defensive, condemning at the same time wars of aggression and territorial aggrandizement.

> J'entends s'élever la voix des partisans de la gloire, de cette vaine gloire qui fait le malheur du monde: ils demandent pourquoi la vérité ne permet pas de mêler à des titres si beaux le titre de conquérant. Pourquoi? C'est que le bienfaiteur des hommes ne peut en être le destructeur! . . . N'est-ce pas dans le choc des empires que le despotisme s'élève, et que les chaînes de l'humanité s'appesantissent? . . . Nous ne sommes plus au temps où des essaims barbares sortaient des glaces du nord. . . . C'était alors qu'il fallait un guerrier pour fonder un empire; mais cet empire est-il fondé, c'est au sage qu'il appartient de le rendre heureux. Si la nature n'eût fait que des héros, la terre eût été bientôt déserte. . . .[19]

Much of Bailly's rhetoric is conventional eighteenth-century verbiage, and it is difficult to determine to what extent he was influenced by contemporary writers.[20] But here surely one can detect the fine hand of Voltaire —in the treatment of history as the complex of human activity, in the plea for enlightened monarchy, in the strong humanitarian vein and, above all, in the diatribe against war. *L'Histoire de Charles XII* suggests itself as the model for Bailly's attack on the concept of the conqueror-king.

The passages on economics are perhaps traceable to two works by *philosophes* which had appeared in 1763: abbé Nicolas Baudeau's *Idées d'un citoyen sur l'administration des finances du roi* (Amsterdam, 1763) and Roussel de la Tour's *La Richesse de l'état* (n.p.n.d.). These two authors proposed ways and means of cutting expenditures and increasing income and specifically called for the abolition of *fermiers généraux, subsides, taille, capitation, vingtièmes, gabelles, aides, octrois, trait-foraines, droits d'entrée, de sortie,* etc. Bailly was no revolutionary in 1767, nor was he a Necker in the realm of money and banking, but his insinuation of such ideas into an *éloge* of a French king is fair evidence that he was literate in matters economic and that he had given some thought to the fundamental ills of the *ancien régime.*

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[11] *Ibid.* 1: 3.
[12] *Ibid.* 1: 17.
[13] *Ibid.* 1: 17.
[14] *Ibid.* 1: 18.
[15] The first Bibliothèque du roi, located in the *tour de la librairie* of the old Louvre. An inventory of this library was published by Van-Praet in 1835.
[16] DISC MEM 1: 21.
[17] *Ibid.* 1: 31.
[18] *Ibid.* 1: 20.
[19] *Ibid.* 1: 23–25.
[20] The catalogues of Bailly's library (see, below, Bibliography, under *Debure*) show that Bailly owned the complete works of Montesquieu, Rousseau, and Voltaire as well as many other contemporaries, but it must be remembered that they represent the state of his library at the end of his career rather than at the period in question.

That he was a friend of the *philosophes* Bailly demonstrated more conclusively the following year in his *Eloge de Leibnitz,* which won the prize offered by the Berlin Academy.[21] Arago regards this work as a contribution to Leibnitziana:

> On croyait généralement que Leibnitz avait été admirablement loué par Fontenelle, et que le sujet était épuisé. Dès que la pièce de Bailly, couronnée en Prusse, vit le jour, on revint complètement de ces premières impressions. Chacun s'empressa de reconnaître que les appréciations de Bailly pouvaient être lues avec profit et plaisir, même après celles de Fontenelle. L'éloge composé par l'historien de l'astronomie ne fera sans doute pas oublier celui du premier secrétaire de l'Académie des Sciences. Le style est peut-être trop tendu; peut-être aussi a-t-il une légère teinte déclamatoire; mais la biographie et l'analyse des travaux sont plus complètes, surtout en tenant compte des notes; Leibnitz, l'*universel,* s'y trouve envisagé sous des points de vue plus variés.[22]

But the *éloge* is more interesting in what it tells of Bailly than in what it adds to Leibnitz. Here for the first time are to be found the methods of composition which Bailly used in his major works; here is his *profession de foi* as a man of the enlightenment; here is the whole fabric, in outline form, of his life's work—the nucleus of ideas, the sources to be explored, the comparative method, the belief in the oneness of truth, the humanitarian bent, and the certitude of human progress. "La philosophie est l'usage de la raison étendu à tout ce qui nous entoure et ramené sur nous-mêmes. . . ." [23]

In the text of the work, Bailly traces a logical development in the philosopher's thinking: his study of jurisprudence, his subsequent concern with history, political institutions, man as a social creature, man as a part of nature, science as an explanation of nature, and his final metaphysical explanation of man, nature, and God. Here Bailly is free to digress, as he frequently does in long and eloquent passages. The biographical details, the learned sources and abstruse arguments are relegated to the notes which follow the text.[24] The result is a very readable piece with supporting evidence where those who want it may find it.

Leibnitz struck Bailly as a powerful example of the compulsion of learning—of the need for and satisfaction in linking fact to fact. Emancipated from his law studies, he was obliged to turn to the philosophic explanation of law and its historic roots. Leibnitz realized that law was the result of a historical chain of events and that these events formed the picture of man's customs and habits. He observed, before Montesquieu, that society was the result of environment as well as of the talents and qualities of the men who composed it. He noticed the relationship between liberty, slavery, tyranny, and democracy on the one hand and the climates, soils, and physical conditions which were associated with them. Bailly was impressed by the universal quality of Leibnitz' precepts and the magnitude of his learning. He learned from Leibnitz to piece together the most disparate evidence and find the common denominator. "Ces faits ne montrent que l'homme modifié par les causes morales et physiques; mais ils tendent vers un centre, qui est l'homme de la nature. . . . Combien d'usages, si différents entre eux aujourd'hui, dénaturés par le temps, ont la même origine!" [25] In the *Eloge de Leibnitz* Bailly, for the first time, conceives of civilization as a great river which flows through history, constantly added to, never diminished. And it became his ambition to find its source at the very beginning of time.

Like Leibnitz, Bailly looked with awe and wonder at the immense tableau of human knowledge: paleontology, geology, botany, anatomy, medicine, chemistry—even alchemy. But above all he was fascinated by the phenomenon of language, "cette clef de toutes les sciences." [26] From Leibnitz he learned that the language of the ancients would reveal "leur source et leur fraternité" [27] and that the "langue universelle" of science [28] would again make all men brothers. Bailly's studies in astronomy and mathematics had taught him the beautiful simplicity of natural law. The singleness of truth became a cult. If the movements of Jupiter's satellites —of indeed all the stars and planets, the universe itself —could be explained in a simple man-made equation, why could not man himself be explained in scientific terms? Bailly saw everywhere in Leibnitz clues to the simple truth, the single source, the formula. "Il avait reconnu que les vérités de toutes les sciences dérivent de quelques vérités premières, traduites et présentées, comme dans la géométrie, sous mille formes différentes. . . . Leibnitz étendait aux autres sciences la certitude des sciences exactes. . . ." [29]

In general, Bailly has only praise for Leibnitz' erudi-

[21] Arago says that this *éloge* belongs to 1767. This is probably the date when the subject was proposed. Berville is obviously in error when he ascribes it to 1769, which is the date of the second (i.e. Paris) edition. The Academy award was made in June of 1768 and the first edition appeared that year. It may well be that the composition dates from 1767, but I have preferred to use publication dates where evidence of composition is lacking.

[22] Arago **2**: 266–267.

[23] DISC MEM **1**: 183.

[24] Bailly acknowledges his indebtedness to "la vie de Leibnitz par M. le chevalier de Jaucourt; . . . l'éloge de Leibnitz par M. de Fontenelle; . . . quelques articles de l'*Encyclopédie;* . . . l'histoire des mathématiques de M. de Montucla; . . . [le] recueil des pièces sur la philosophie de Leibnitz, Clarcke et Newton, etc., par M. Desmaiseaux, et . . . tous les écrits de Leibnitz qu'on a pu se procurer." (DISC MEM **1**: 236.) It is obvious, however, that Bailly had a clear understanding of the works of most post-Renaissance thinkers, including Descartes, Bayle, Locke, Cassini, Huygens, Pascal, Barrow, Boyle, Bernoulli, etc.

[25] DISC MEM **1**: 189.

[26] *Ibid.* **1**: 196.

[27] *Ibid.* **1**: 197.

[28] *Ibid.* **1**: 198–201.

[29] *Ibid.* **1**: 200–201.

tion, his mathematical discoveries and scientific theories. The one exception is Leibnitz' explanation of the origin of the earth.[30] The cautious statement that "ce système de Leibnitz est peut-être plus hardi que solide"[31] is backed by a two-page quotation from Buffon's *Histoire naturelle.* Although Bailly has some misgivings about Leibnitz' metaphysical ideas, more polite—or less opinionated—than Voltaire, he reviews them sympathetically. He regards speculation on unanswerable questions as a perfectly valid activity and approves of "la vraisemblance substituée à la vérité inaccessible."[32] In this *éloge* Bailly commits himself to the type of thinking which has come to be called somewhat contemptuously "esprit de système"; his yardstick is that indefinable, indispensable thing called *vraisemblance.* Applying this measure to Leibnitz' metaphysics, however, Bailly finds room for doubt. Of the system of monads he writes: "Nous ne jugerons point du degré de vraisemblance de ces idées; mais on conviendra qu'elles étonnent par leur profondeur et leur sublimité."[33] Of Leibnitz' *harmonie préétablie:* "Peut-être ce système ne résoud-il une difficulté que par des difficultés insolubles. . . . "[34] Bailly is more positive when he deals with *le mal moral et physique* and the concept of *le meilleur des mondes:*

> Ce système de l'optimisme console un moment l'humanité effrayée des désordres qui l'environnent; chimère brillante, dont le prestige efface les maux éloignés, et cède à la douleur présente. Philosophe sublime, pendant que tu raisonnes, écoute les cris qui t'assiègent; l'Asie esclave te demande si le genre humain fut formé pour cinq à six tyrans; l'Amérique, inondée du sang de ses habitants, si des barbares avaient le droit de les égorger; et l'Europe, assise sur des volumes des lois, te montre que le crime secoue sa chaîne et règne encore dans le meilleur des mondes. Sois juste, et tu verras l'homme marchant à la mort, consumé par le travail et la maladie, traîner sa vie entre la crainte et la douleur. . . . Aveugle, que parles-tu d'ordre et de bonheur![35]

This indictment of optimism is not so much akin to Voltaire's thought as it is to traditional Christian teaching. Bailly argues the after-life as a refuge from earthly oppression and suffering. Moreover, he objects to optimism on the grounds that it is *invraisemblable,* but not on the grounds that it proceeds from metaphysical speculation.

The analysis of these first two *éloges,* which are, after all, minor works, is germane to the question of Bailly's relations with the *philosophes.* He has been accused of straddling the fence on any issue involving constituted authority, e.g. church or monarchy. Arago says, "le patriotisme de Bailly aurait pu, je voulais dire aurait dû, se montrer plus susceptible, plus ardent, plus fier. . . . Bossuet, Massillon, Bourdaloue firent retentir la chaire de paroles bien autrement hardies."[36] Nourrisson, no friend of the Revolution or of Bailly, says, "Tantôt Bailly se pose en champion de l'autorité et en défenseur de la monarchie. . . . Tantôt, au contraire, et le plus souvent, c'est en disciple de Rousseau qui pérore, ne parlant que de pacte, de république, de peuple, de philosophie, de vertu."[37] And again: "Ami des Encyclopédistes, foncièrement imbu de leurs idées, protégé même par les plus célèbres d'entre eux,[38] il s'était néanmoins soigneusement abstenu de collaborer à l' *Encyclopédie.*"[39]

Bailly's own definition of the role of the *philosophe* which is found in the last pages of the *Eloge de Leibnitz* does, indeed, tend to substantiate the views of Arago and Nourrisson. Like most eighteenth-century writers, he attributes to the *philosophe* a superiority of vision based upon universality of interests:

> Les connaissances des siècles tiennent à quelques vérités générales; c'est par ces vérités que le génie les saisit et les réunit. Celui qui se borne à un genre circonscrit lui-même ses idées; celui qui les a tous parcourus connait seul la nature.[40]

The subtle distinction between truth (*vérité*) and knowledge (*connaissances*) is, one suspects, a difference of degree rather than of kind. Knowledge, it appears, is for the *vulgaire,* while truth is in some measure accessible to the *philosophe,* who becomes the interpreter of nature and the chief instrument of human progress. But if this universality of mind enables the *philosophe* to judge and control society, it also teaches him a moral integrity which acts as a restraining force.

> Il respecte ici [la religion]; elle est l'ouvrage de Dieu: là, il la conserve; elle est nécessaire à l'homme dont elle est l'ouvrage. De là descendant aux souverains du monde, il les révère quand ils sont justes; il obéit quand ils ne sont que ses maîtres.[41]

If Bailly does not sound like a revolutionary, it is because he was never a real revolutionary—either in 1768 or in 1789. His notions of reform were mild and based as much on example as on precept.

> [Le philosophe] regarde les vices, les préjugés comme ses seuls ennemis, et combat les uns par l'exemple de sa vertu tandis qu'il accable les autres de ses lumières.[42]

[30] Leibnitz had suggested that the earth was originally a fiery mass like the sun and that its core, now that it has cooled, is of glass. This concept is not so different from the one that Buffon advanced and which Bailly accepted. However, Bailly objected to Leibnitz' belief that the whole surface of the earth had at some time been covered by water which had somehow managed to recede or evaporate, leaving marine fossils on the mountain tops.

[31] DISC MEM **1**: 215.

[32] *Ibid.* **1**: 216.

[33] *Ibid.* **1**: 224.

[34] *Ibid.* **1**: 225.

[35] *Ibid.* **1**: 229–230.

[36] *Op. cit.* **2**: 265.

[37] *Trois Révolutionnaires,* 340.

[38] This statement is inaccurate. Bailly was ignored by Diderot, patronized by Voltaire and despised by d'Alembert. Lacretelle remarks with more justice: "Estimé des philosophes, il était plutôt leur discret ami que leur guide." (*Histoire de France pendant le 18e siècle* **6**: 39.)

[39] *Trois Révolutionnaires,* 349.

[40] DISC MEM **1**: 233.

[41] *Ibid.* **1**: 234.

[42] *Ibid.* **1**: 234.

Moderation, in an age of reform, is easily confused with timidity. It was deep-rooted conviction which kept Bailly from associating himself completely with the more ardent *philosophes* and which, during the Revolution, exposed him to ill-founded accusations of betrayal.

The *Eloge de Leibnitz* was not an unqualified success for Bailly. The text of the Berlin edition is preceded by a "Jugement de la Classe des Belles-lettres" which amounts to a dissenting opinion in the Academy's award. Bailly's style and coverage are criticized, and the judgment ends with this patronizing observation:

> Au reste, comme l'esprit d'hypothèse ne fait point le fond de la philosophie d'un grand homme, on a cru pouvoir pardonner à l'auteur de n'avoir pas quelquefois paru bien saisir certains systèmes de Leibnitz. . . .[43]

The same year (1768) Bailly produced an *éloge* of quite a different nature, that of Corneille, which won the *accessit* of the Academy of Rouen. This work is divided into two parts, in the first of which are examined the individual plays of Corneille and his contributions to the theater. The second part deals with Corneille's influence on his contemporaries and the trend of dramatic writing among his successors. Bailly's judgment is interesting and generally in accord with that of modern critics, if one excepts his admiration for *La Mort de Pompée*. Corneille's success is attributed to his skill in creating *vraisemblance*, in making the action arise from the emotions of his characters and in identifying the spectator with the players. Bailly calls him "le premier . . . qui déploya la passion contre la passion, employa l'art inconnu de rendre une situation plus terrible en immolant par degrés ses victimes et en perçant à coups redoublés l'âme du spectateur."[44] Medea would have been more convincing "si ses ressources eussent été dans son courage et non dans un art dont le prestige est évanoui. Le merveilleux n'était pas alors banni de la scène; il attendait Corneille pour disparaître."[45] The change is effected in *Le Cid*, where Rodrigue is "l'homme entraîné par ses penchants."[46] "Ici les crimes ne sont point accumulés; tout s'enchaine comme dans le cours de la vie; l'imprudence d'un seul homme a tout fait."[47] Bailly interprets *Le Cid* as a conflict between natural inclination and allegiance to an outworn code of honor.

> . . . ainsi le spectateur partagé éprouve ce déchirement douloureux d'une âme qui se sacrifie. Il revient sur lui-même; il se peint avec effroi les préjugés d'un honneur faux et cruel, ces chaines absurdes que tant de peuples se sont imposées; il frémit en songeant que ces chaines sont respectables, et que l'homme de courage, qui les déteste, n'ose entreprendre de les briser. . . .[48]

Bailly has high praise for *Horace* ("cette tragédie qui serait le chef-d'œuvre de l'esprit humain si elle finissait au quatrième acte"),[49] *Cinna, Polyeucte,* and *Rodogune*. He is less enthusiastic about *Héraclius, Don Sanche, Nicomède,* and *Sertorius*. Of the later plays he has nothing to say, and, the more surprising in an *éloge*, he writes of Corneille's decline, "Corneille laisse un important exemple. Quel homme peut se flatter de ne pas survivre à son talent?"[50]

Bailly's chief praise for Corneille is as an innovator. "Quelle distance infinie des pièces de Hardy à la *Mélite* de Corneille, de *Mélite* au *Cid*, et du *Cid* à *Cinna*."[51] "Le haut comique est né du *Menteur*. . . . L'opéra même est dû au génie de Corneille. . . . "[52] Corneille's stagecraft is praised for continuity of action, the appearance of characters only when they are necessary to contribute to the action, and, therefore, sustained interest in the characters. Above all, the plays are animated by the type of dialogue of which Bailly claims Corneille was the inventor—a short, compressed dialogue in which the ideas, frequently contained in a hemistich, come forth in rapid succession like so many blows.[53]

The *éloge* ends with a general review of the classic theater, in which Racine fares less well than Corneille.

> Corneille s'était proposé d'exciter l'admiration; Racine commença par l'imiter; mais désespérant de l'atteindre, il fit usage de la sensibilité. L'art de Racine est de pénétrer jusqu'au fond du cœur, d'en développer les replis, et ses peintures sont embellies de la pureté du langage et des trésors de la poésie.[54]
>
> Ces deux hommes rares, si souvent comparés, n'étaient pas faits pour l'être. Racine, doué d'un génie moins vaste, peignit des mêmes traits Hermione et Roxane, Bajazet, Xipharès, Hippolyte et Britannicus. Les héros de Corneille ne se ressemblent que par le caractère de grandeur qu'ils tiennent de lui. Racine suivit et embellit toujours la nature, mais la nature agitée par les passions qui l'affaiblissent; Corneille voulut lui inspirer celles qui devaient l'agrandir.[55]

Bailly accepts the point of view of his times. He sees in Corneille a dominant didactic purpose. "Le but de Corneille fut de former des hommes; et c'est à ce titre que lui est dû l'hommage de la philosophie."[56] And again: "Nous osons dire qu'il a regardé le théâtre comme une école publique."[57] Popular prejudice always resists the philosopher's reason, but the poet, never speaking in his own name, identifies his listener with the character on stage before him. The audience, condemning the vices and applauding the

[43] *Loc. cit.*, ii. The edition of 1790 bears the note: "L'auteur a fait quelques corrections à cette pièce."
[44] DISC MEM **1**: 38.
[45] *Ibid.* **1**: 40.
[46] *Ibid.* **1**: 44.
[47] *Ibid.* **1**: 41.
[48] *Ibid.* **1**: 41.
[49] *Ibid.* **1**: 47.
[50] *Ibid.* **1**: 50. This passage is peculiar to the edition of 1790. The first edition conveys the same sense in many more words.
[51] *Ibid.* **1**: 46.
[52] *Ibid.* **1**: 51.
[53] *Ibid.* **1**: 51.
[54] *Ibid.* **1**: 64.
[55] *Ibid.* **1**: 53.
[56] *Ibid.* **1**: 67.
[57] *Ibid.* **1**: 69.

virtues presented in the play, is in fact exercising its own reason. "C'est ainsi que le poète éclaire en ne paraissant que peindre la nature, tant les hommes ont besoin d'être séduits pour être éclairés." [58] It is interesting, in view of his later relations with Voltaire, that Bailly regards Voltaire's theater as the culmination of classic art, with its combination of "effet théâtral" and "philosophie." Lacretelle suggests that Bailly's praise for Voltaire ten years later was something of a sham: "pour l'aborder dans un commerce épistolaire, il fit provision d'encens. . . ." [59] However, the remarks in the *Eloge de Corneille* are gratuitous.

Bailly's literary criticism is less profound than his scientific judgment, but one cannot fail to be impressed by the latitude of his interests. The *Eloge de Corneille* reveals an imagination and a refinement of taste [60] which are pleasant adjuncts to his scientific mind. Encouraged no doubt by the success of the *éloges* of Leibnitz in Berlin and Corneille in Rouen, Bailly returned in 1769 to the tribunal of the Académie Française with his *Eloge de Molière,* which won the *accessit.*[61] This work, although of lesser quality than the one on Corneille, offers an even broader discussion of the purpose and methods of the theater. It is as a philosopher and disciple of Gassendi that Molière is appraised.

> . . . Molière ne fut pas moins philosophe que poète. Dans tous les siècles, les grands poètes et les grands philosophes ont été rares; ce qui est plus rare, ce qui a rendu Molière inimitable, c'est d'avoir été l'un et l'autre à la fois.[62]

Molière's chief contribution to the theater, according to Bailly, was the application of Corneille's technique to comedy—that is, he was the first to make character rather than plot the principal source of interest. However, he realized the importance of incident in comedy.[63] Bailly distinguishes between the plays in which a dominant character determines the action—he cites *Tartuffe* and *L'Avare* in this category—and those in which the action, starting with secondary figures, develops and molds the main character—as in *Le Misanthrope.*[64] Feeling the need for a single pivot on which to make the play turn, Molière limited himself initially to the single plot; in his later plays, however, he managed sub-plots equally dependent on the central figure.[65] In short, Molière brought unity of action to the comedy.

Bailly fails to exploit the "philosopher" concept in dealing with Molière's stagecraft, although he suggests a line of thought when he remarks, "Tout est en récit, et tout semble en action." [66] It was Molière's power of analysis, his ability to "pénétrer l'homme au travers de l'homme" [67] which appealed to Bailly, and this analysis he ascribed to Gassendi's influence. "Si Gassendi n'eût pas enseigné Molière, peut-être les leçons du philosophe eussent-elles manqué au poète." [68] Curiously enough the admiration persists in spite of what he regarded as Molière's repeated attacks on science. "Il fit les *Femmes savantes,* dont le titre ne semble porter que sur les femmes en qui la science est un ridicule; mais on voit par la pièce que l'auteur en voulait à la science même." [69] And again: "Il tenta de renverser le trône de la médecine, de cette science qui s'appuie sur une observation constante et dont la destinée est de n'avoir qu'une marche incertaine." [70] But Bailly does not go off the deep end in his criticism as did Rousseau. Molière is excused with an admonition on the dangers of the "antidote qui est souvent lui-même un poison." [71]

Bailly is at pains to demonstrate the moral value of the stage. "Corneille, en s'illustrant au théâtre, éclaire la nation qui applaudit à ses pièces, le théologien qui les condamne et Bourdaloue qui monte en chaire pour les dévouer à l'anathème." [72] Similarly, Molière aims to "former des citoyens et des hommes." [73]

> Si la plupart des pièces de Molière n'avaient pas un but moral, je n'aurais pu l'envisager comme philosophe. . . . Mais, diront les censeurs du théâtre, l'effet moral n'a pas lieu, parce que les spectateurs, en riant aux dépens des dupes, se rangent du parti des fripons. Que conclura-t-on de cette objection si souvent répétée? Le théâtre a cela de commun avec la scène du monde, avec l'histoire où l'on convient de puiser des leçons. . . . Le théâtre est utile comme l'histoire pour qui sait s'intruire par l'exemple et s'éclairer soi-même en jugeant les autres.[74]

This is aimed specifically, if belatedly,[75] at Rousseau's *Lettre sur les spectacles.* Rousseau had objected that the moral lesson—if any—of *Le Misanthrope* was obscured or canceled out by the handling of the main character. Bailly tries to persuade his reader that Molière "rend le personnage comique sans le faire paraître ridicule." [76] Similarly, he answers Bossuet's criticism of Molière for having "étalé les avantages

[58] *Ibid.* 1: 58.
[59] Eloge, 1007.
[60] In note 12 (DISC MEM 1: 80), in an analysis of the poetry of *Médée,* Bailly "feels" the difference between the slightly ridiculous:

J'accommode ma flamme au bien de mes affaires.

and the new note which Corneille strikes in:

Sachant ce que je puis, ayant vu ce que j'ose,
Croit-il que m'offenser ce soit si peu de chose?

[61] This time the prize went to Chamfort.
[62] DISC MEM 1: 120–121.
[63] *Ibid.* 1: 103.
[64] *Ibid.* 1: 105.
[65] *Ibid.* 1: 113–114.
[66] *Ibid.* 1: 108.
[67] *Ibid.* 1: 120.
[68] *Ibid.* 1: 96.
[69] *Ibid.* 1: 128.
[70] *Ibid.* 1: 129.
[71] *Ibid.* 1: 130.
[72] *Ibid.* 1: 63.
[73] *Ibid.* 1: 123.
[74] *Ibid.* 1: 124–125.
[75] Rousseau's letter to d'Alembert had appeared in 1758.
[76] DISC MEM 1: 106.

d'une infâme tolérance dans les maris" and soliciting "les femmes à de honteuses vengeances." [77]

Hé quoi! le but de Molière peut-il être méconnu? Il montre par *L'Ecole des maris,* par *L'Ecole des femmes,* les dangers où l'innocence est exposée dans l'esclavage et dans l'ignorance; il enseigne qu'on ne peut être vertueux sans être libre et sans être éclairé.[78]

It is interesting to note that Bailly draws an analogy between art and history as sources of moral instruction, but that, in the last analysis, it must be the spectator's own judgment which interprets the lesson.

Intimately bound up with the morality of the theater was the prejudice against actors and acting, and Bailly shows himself to be as much the defender of the actors as of the playwright. "Jusqu'à quand les préjugés veilleront-ils à la porte de ce sanctuaire du goût, que le gouvernement couvre de son ombre, et où le plus beau des arts peut inspirer la vertu?" [79] Actors, as a class, says Bailly, are among the most talented and sensitive of all artists and, as such, deserve the encouragement and esteem of their fellow men.[80]

Pour nous, ne dégradons point un état que Molière a honoré de son génie. Nous n'avons rien à recommander aux ministres de la religion; mais nous pouvons revenir sur les vains préjugés qui flétrissent une profession utile. Osons être justes, en cessant d'être inconséquents; n'exposons point des âmes nobles à l'opprobre, ou ne demandons point à des âmes avilies les leçons du courage et de l'honneur; surtout ne croyons point avoir le droit de blâmer leurs mœurs; si elles sont mauvaises, c'est nous qui les leur avons données, car l'avilissement mène à la dépravation.[81]

In all this defense of the theater, one can detect, along with the philosophic verbiage of the times, the sometime poet and dramatist in Bailly, the author of *Clothaire, Iphigénie,* and *Le Soupçonneux,* the friend of Lanoue and the habitué of the theater. "Bailly aimait . . . les spectacles et même les bals de l'opéra, où nous avons souvent ensemble passé des nuits de carnaval." [82] As late as 1790, in his capacity of Mayor, Bailly took a personal hand in the affairs of the theater, when he defended Talma against a royalist cabal at the Comédie [83] and served as a one-man court of appeal for actors and playwrights.[84] If his own plays have disappeared (and they might well have shown him to be a *Molière manqué*), these *éloges* at least reveal another facet of this remarkable man's interests.

One more *éloge* probably belongs to this period [85]—that of the abbé de Lacaille, by far the best written, because the most deeply felt. This is the homage of the apprentice to his master, of the student to his teacher: "c'est aux bontés de M. de Lacaille que j'ai dû mes premières connaissances sur l'astronomie; qu'il me soit permis de louer mon maître." [86] Without retracing in detail the multiple activities of Lacaille,[87] we may note in passing some of his striking deductions which are still the subject of lively interest in modern astronomy and with which Bailly deals in the *éloge:* the oblateness of the earth; [88] the latitudinal variation of atmospheric refraction; [89] and the movement of the "fixed" stars.[90] Bailly paints an intimate portrait of the kindly, wise, and diligent astronomer who had inspired in him both respect and affection. This was not an academic work, offered in competition for a prize of eloquence, but an act almost of filial piety. Whether in spite or because of Bailly's motive, the appreciation which emerges strikes the reader as the most accurate among his early writings.

It is clear from the *Eloge de Lacaille* that Bailly had at this date no thought of abandoning astronomy. If he wrote intelligently of economics, history, metaphysics, and the drama in the previous *éloges,* here he writes with animation and zeal of the subject that was closest to him. The astronomer, for Bailly, is an interpreter of nature, a sort of high priest of cosmic forces. His novitiate is long and exacting; his meditations demand solitude and severe discipline; but the satisfaction of having contributed to the increase of knowledge more than repays the sacrifices involved.

L'astronome qui n'aurait que l'art d'observer, en amassant des observations, ressemblerait assez à un étranger qui dresserait une liste de mots dans une langue qu'il n'entendrait pas. Il faut qu'un astronome possède toutes les causes réelles ou optiques qui compliquent le mouvement des astres, qu'il ait approfondi les théories des géomètres célèbres de nos jours, qu'il soit en état de les comparer avec les phénomènes, de prévoir les cas qui sont les plus propres à cette comparaison, enfin qu'il puisse régler ses observations sur un plan raisonné, un système suivi que la théorie lui fournit. C'est alors que l'astronome est digne de prononcer entre la nature qui semble refuser sa marche à nos recherches et le géomètre qui s'efforce de la deviner. Voilà ce qu'était M. l'abbé de Lacaille, et nous ne craignons point de le proposer pour modèle. . . . [91]

We may see in this passage the precepts which the teacher laid down for the pupil. So long as Bailly was

[77] *Ibid.* 1: 127.
[78] *Ibid.* 1: 127.
[79] *Ibid.* 1: 67–68.
[80] *Ibid.* 1: 75–76.
[81] *Ibid.* 1: 135–136.
[82] Mérard de Saint-Just, 174.
[83] Over a performance of Marie-Joseph Chénier's *Charles IX.* (Goncourt, *La Société française pendant la révolution,* 99–100.)
[84] *Ibid.,* 163–164.
[85] The *Eloge de l'abbé de Lacaille* was written after 1763, for Bailly refers to Grandjean de Fouchy's *éloge* which was read before the Academy that year, and before 1770 when it appeared in print for the first time.
[86] DISC MEM 1: 139.
[87] See *supra,* p. 430, n. 17.
[88] Lacaille's measurement of the degree in the 33° South supplemented the work of Maupertuis in Lapland and of La Condamine at the equator.
[89] "M. de Lacaille trouva que les réfractions étaient plus petites d'un quarantième au Cap qu'à Paris." (DISC MEM 1: 169.)
[90] Lacaille compared La Hire's observations of 1680 with his own for 1750 and deduced a general motion for the phenomenon that had already been noted in Sirius, Aldebaran, and Arcturus.
[91] DISC MEM 1: 146.

active in the field of astronomy, Lacaille remained his model. Bailly modestly makes no reference to the part he played in the reduction of Lacaille's observations for the *Ephémérides* published posthumously.[92]

Bailly enjoyed moderate success with the *éloges*. Of the four submitted in competition for prizes, one took the prize and two received honorable mention. Although those of Charles V, Molière, and Lacaille did not immediately appear in print, the other two went through two editions each. In 1770 a collected edition of the five *éloges* was published in Berlin and Paris by Delalain. Yet, if Bailly was seeking fame and fortune by this type of writing, it must be admitted that he missed the mark. The *éloges* did not win him the secretariat of the Academy of Sciences. An anecdote told by Cubières reflects a certain disillusionment with *éloges* and academies in general:

> Un volume avait paru dans le temps, qui renfermait ses premiers essais dans ce genre, et ce volume était imprimé sous l'anonyme. Comme nous étions proches voisins . . . il vint chez moi un matin et me dit: N'auriez-vous pas un volume anonyme renfermant les éloges de quelques grands hommes, entre autres ceux de Leibnitz, Corneille, Molière? —Oui, monsieur, lui répondis-je, je les ai.—Pourriez-vous me les prêter?—Avec grand plaisir, les voilà.—Que pensez-vous de ces éloges?—Je les ai trouvés fort bien écrits et annonçant de grandes dispositions à l'éloquence. Celui de Leibnitz, entre autres, m'a paru supérieur à celui de Leibnitz par Fontenelle, quoique celui de Fontenelle soit admirable. Bailly se tut, emporta le volume et revint deux jours après me le rendre, en me disant:—Les quatre éloges renfermés dans ce volume sont de moi et ne valent rien du tout; ce volume, imprimé à Berlin, est devenu très rare, et je vous le rapporte, quoique je ne l'aie pas. Vous me le prêterez de nouveau si par hasard j'en ai besoin.—Mais, monsieur, l'éloge de Leibnitz qui a remporté le prix!—Un prix d'académie ne prouve rien; la plupart des ouvrages couronnés ne sont que des folies de jeunesse. Et il partit en achevant ces mots.[93]

If Cubières' story is true (and there is no particular reason to doubt it), Bailly was either excessively modest or a little bitter. The latter is more likely in view of his disappointments in the Academy of Sciences.

The *éloges*, "folies de jeunesse" or otherwise, give evidence of the development of Bailly's thought. Typical of his age, he is less interested in the aesthetic form than in the didactic purpose of art. Convinced of the enlightened superiority of his own age, he is also intrigued by the concept of natural man, by which is meant not primitive man but the common denominator of man in all societies at all periods. History, law, art, and science are all seen as expressions of man's physical and moral progress. The composition of the *Eloge de Leibnitz* especially was to have a profound and lasting effect on Bailly. Although he gives voice to the credo of the *philosophe*, of the universal man, it was the *système* that was to attract him, the "vraisemblance substituée à la vérité inaccessible." From the period of these *éloges* we may date the germination of ideas that find their way into the history of astronomy, the Atlantean theory and the essay on fables. From this period also Bailly learned to be articulate without numbers and symbols. The *éloges* were, after all, *pièces d'éloquence*, and in writing them Bailly served a useful apprenticeship, for it was in the field of expression, in the art of writing, that Bailly was to win public recognition.

[92] See *supra*, pp. 435–436.

[93] *Recueil*, xx–xxii.

III. THE FIRST IMBROGLIO

Jupiter's orbit, collaboration with Grandjean de Fouchy, the light of Jupiter's satellites, the fight for the secretariat, the quarrel with Lalande, Bailly at Chaillot

Je hais toute discussion polémique; j'aime surtout à vivre en paix avec mes confrères.

Bailly, "Lettre à M. Bernoulli."

In the light of the preceding chapter it might appear as if this period in Bailly's life had been spent in the composition of *éloges* at the expense of scientific research, but such was not the case. Fouchy had been criticized for abandoning astronomy when his secretarial duties began to take him into the literary field. Bailly was not prepared to repeat this mistake. During the same years that the *éloges* were appearing (1767–1770) he was busy with more observations of Jupiter, research on the eccentricity of its orbit, and the transit of Venus. After the pitched battle with Condorcet for the secretariat, Bailly presented one of his longest and finest papers on the satellites of Jupiter. But this "beau mémoire," as Arago calls it, was substantially his swan song in the Academy of Sciences. Thereafter, in the years 1772–1774, Bailly began to find new outlets for his energies.

In June of 1768 he published the results of his observations of the opposition of Jupiter of April 6.[1] Happily the *Mémoires* of the Academy include two other reports of the same event (those of Lalande and Jeaurat) which afford an opportunity of comparing Bailly's work with that of his colleagues. Jeaurat's observations were from time to time shown to be in error, but Lalande was much admired as an accurate observer. The results of the three reports are therefore interesting in view of the close correlation between them. It should be noted that all three observed in Paris, and their determinations are therefore directly comparable.

	Jeaurat	*Lalande*	*Bailly*
Moment of opposition (Paris mean time)	$18^h31^m18^s$	$18^h13^m11^s$	18^h19^m
Heliocentric longitude of Jupiter	$6^s17°56'5''$ ($197°56'5''$)	$6^s17°55'29''$ ($197°55'29''$)	$6^s17°55'45''$ ($197°55'45''$)
Geocentric latitude	$1°35'54''$	$1°35'37''$	$1°35'30''$

Bailly's determinations, except in latitude, fall between those of Jeaurat and Lalande, which would suggest a fairly high degree of accuracy in his observation.

Most of this year Bailly must have devoted to his "Recherche de l'équation du centre de Jupiter." [2] He discovered more and more, as he progressed with his work on the satellites, that the elements of the orbit of the planet were not sufficiently established.

C'est un élément très important pour la théorie des satellites de Jupiter que l'équation du centre de la planète principale. Cette équation influe directement sur le calcul des éclipses des satellites, puisqu'on y suppose donnée la longitude vraie de Jupiter; mais cet élément est encore essentiel dans le cas où l'on cherche les dimensions de l'orbite du satellite; les effets de son excentricité peuvent se combiner avec les effets de l'excentricité de Jupiter, de manière que l'on ne puisse les démêler les uns des autres, si l'on est incertain de la vraie quantité de l'équation du centre de Jupiter.[3]

The problem was threefold: to determine the eccentricity of the orbit, the movement of the aphelion, and the acceleration of the planet. Bouillaud in 1645, La Hire in 1702, Halley in 1719, and Cassini in 1740 had all established the equation of the center of Jupiter, but their estimates differed by as much as 3′. Jeaurat had supposed, in his tables published as an appendix to Bailly's *Essai sur la théorie des satellites de Jupiter* in 1766, a variation of 7′20″ in the equation over a sixty year period. In 1767 Wargentin announced a secular increase in the equation of 2′15″. Lagrange accepted this theory, but reduced the rate of increase to 1′2″ per century. Bailly decided to abandon the satellites long enough to take a personal hand in this investigation. "J'ai pensé qu'un nouvel examen de ces éléments ne pouvait pas être inutile et que mes résultats fourniraient un nouveau degré de certitude à celui des astronomes avec lesquels ils s'accorderaient." [4]

Using some fifteen sets of observations of oppositions of Jupiter made between 1586 and 1759 and an additional set from the second century A.D., Bailly deduced that the eccentricity of Jupiter's orbit was increasing at an increasing rate.

Si l'on compare les observations de 1690, 1684, 1667 et 1661, réduites à une même époque, on . . . aura . . . 1′56″ par siècle; 1607 réduite à 1590 . . . on aura . . . 1′43″ par siècle. Si l'on compare l'équation de centre de 1762 à celle de 136, on aura 21′22″ en seize cent vingt-six ans, ou 1′19″ environ par siècle; ces trois résultats diffèrent assez, et si les observations étaient assez précises pour qu'on pût regarder ces résultats comme exacts, ils indiqueraient dans l'équation du centre une augmentation inégale et croissante; mais comme les observations de la fin du XVI[e] et du commencement du XVII[e] ne sont pas susceptibles de cette précision, il s'ensuit qu'elles suffisent pour prouver l'augmentation de l'équation de centre, mais non pour déterminer exactement la quantité; il faut qu'il s'écoule encore quelques siècles.[5]

[1] MEM AC SCI 1768: 415–417.

[2] *Ibid.*, 501–519. The equation of the center corrects the supposed location of a planet moving in a hypothetical circle to its real location moving in an ellipse, thus giving the eccentricity of its orbit.

[3] *Ibid.*, 501.

[4] *Ibid.*, 503.

[5] *Ibid.*, 509–510.

The result of this calculation was to rule out any theory of a constant equation and to confirm, at least in principle, the notions of Wargentin and Lagrange.

Using the same set of data, Bailly thought he found a very slight increase in the rate of movement of the aphelion of Jupiter's orbit, but he settled for the 57.4″ annual change calculated by Cassini (in preference to Halley's 1′12″ and Wargentin's 1′2″). For the third problem, Bailly simply compared the observations of various astronomers (Cassini, Halley, Wargentin) with Lagrange's law of acceleration. He found an annual rate of advance of 0.1733″ as compared with Lagrange's predicted 2.7402″ and concluded (perhaps a bit smugly): "C'est à cet excellent géomètre à voir d'où peut venir cette énorme différence entre la théorie et l'observation." [6]

Grandjean de Fouchy gave Bailly an approving academic nod which still held out a hope of succession to the secretariat: "Tous ceux qui connaissent l'importance de la théorie de Jupiter sont en état d'apprécier le mérite de ses recherches." [7] Whether Bailly was actively courting the favor of Grandjean de Fouchy or whether the two simply found it pleasant or convenient to work together it is impossible to say. In any case, they collaborated the following year (1769) in observing the second transit of Venus within the decade. This time there was even greater coverage than in 1761,[8] and, although the observations made in western Europe were, on the whole, unsatisfactory because of bad weather and because the transit occurred near sunset, the results were more conclusive than those obtained eight years earlier. Lalande correctly deduced from the multiplicity of observations in widely scattered places the sun's geocentric parallax (8.8″).

Fouchy, Bailly, and de Bory [9] observed at the garden pavilion at La Muette, the King's Cabinet de Physique near Passy. The transit was to occur near sunset on June 3, and the two previous days were spent in trying to correct the error of their clocks, which was extremely difficult because persistent rain and cloudiness limited the number of corresponding altitudes which they were able to take. June 3 was cloudy, but the sky cleared just in time for the observers to see the first contact of Venus and to observe the beginning of the transit. Exact measurements were impossible, because the sun was very close to the horizon; a sudden shower, which did not obscure the sun, further complicated matters by driving a large crowd of Saturday sightseers into the shelter of the pavilion: "il y avait du bruit et de la confusion." [10]

The following day the same three observed a partial eclipse of the sun. The sky was serene and there were no sightseers. For both observations they used the same instruments: de Bory, an achromatic telescope five feet long with a 2 inch aperture; Fouchy and Bailly each, a telescope with a 4.5 inch aperture and a 30 inch focal length, especially designed by Dom Noël [11] who was their "host." The report of their work, although it appears in the name of all three,[12] is clearly written by Bailly, as it is in the first person throughout.

On July 14, 1770, Bailly became *associé astronome*, replacing Legentil, who became *vétéran*.[13] The same year marks the beginning of the fight for the secretariat. Grandjean de Fouchy decided to ask for an *adjoint*, and his choice fell upon Condorcet who had just been admitted to the Academy the previous year. It was probably Condorcet who wrote the history of the Academy and the necessary *éloges* for Fouchy during the next three years. This spontaneous choice displeased a number of members who felt that it automatically established a succession. They would have preferred Bailly who had demonstrated his abilities as an astronomer and mathematician and who was regarded as an eloquent and talented speaker.[14]

D'Alembert, who by all accounts had first suggested to Bailly that he ought to succeed Fouchy, switched sides and joined the Condorcet faction. Buffon came to Bailly's support. Fouchy stuck to his guns, and the Academy was divided into two camps. Bailly's friends and admirers regarded d'Alembert's behavior as gross treachery:

> Toute l'Académie connaissait les désirs manifestés et les prétentions légitimes de Bailly. Personne ou presque personne ne doutait qu'il ne réunit toutes les voix. Mais sans égard à ses engagements antérieurs, qui lui devaient être sacrés, d'Alembert appuya de tout son crédit Caritat de Condorcet; à sa seule instigation le marquis se mit sur les rangs. . . . On reprocha à d'Alembert hautement et en pleine Académie de mendier les ordres du roi; on lui rappela combien lui-même avait déclamé contre les démarches

[6] *Ibid.*, 516.

[7] HIST AC SCI 1768: 121.

[8] Besides a great number of observations made in Europe, there were many others made along the east coast of North America, at points in the Caribbean, California, Hudson Bay, Lapland, in the Arctic Ocean, Mexico, Batavia, etc.

[9] Probably Gabriel de Bory (1720–1801), scientist, navigator, and cartographer, whose maps of Finistère had won him the esteem of the Academy of Sciences. De Bory was briefly (1761–1762) Governor General of Santo Domingo.

[10] MEM AC SCI 1769: 533.

[11] Dom, abbé or, more jocularly, père Noël was director of the Cabinet de Physique from the time of its founding *circa* 1750 until his retirement in 1774. See Mar, Le Cabinet de physique du roi, in Société historique d'Auteuil et de Passy, *Bulletin* 3: 152–153.

[12] Observations du passage de Vénus sur le soleil le 3 juin 1769 . . . par MM. de Fouchy, de Bory et Bailly, in MEM AC SCI 1769: 531–538.

[13] The institution of *vétérance* in 1707 was designed to take care of active academicians who, for official reasons, were nonresident in Paris over long periods of time. It allowed the election of enough new members to keep the sessions of the Academy at full strength. Legentil had been sent off to India to observe the transit of Venus of 1769, and he remained there for ten years, observing and studying the astronomy of the Hindus.

[14] Maury, *L'Ancienne Académie des Sciences*, 164–165.

faites pour l'empêcher de succéder aux fonctions de Duclos, en qualité de secrétaire perpétuel de l'Académie française.[15]

It is clear that d'Alembert changed his mind; it is not clear that he did so abruptly or with malice aforethought. When he made advances to Bailly, Condorcet was not even a member of the Academy and Bailly gave promise of being a valuable addition to the faction of the *philosophes*. In all probability that promise waned somewhat with the passing of time. Bailly's *éloges* were not sensational.[16] To be sure his astronomical research did him credit, but in d'Alembert's eyes it took something more—a crusading spirit—to be a good *philosophe*. Everything leads us to believe that Bailly was too conservative for d'Alembert; he was eloquent without being brilliant; he was too anxious to reconcile, to defend, to temporize.

Moreover, and this was his greatest sin, he had the support of Buffon. Buffon, proud of himself and proud of his reputation (built to some extent on the groundwork of his intellectual superiors), was the treasurer of the Academy, and during the dotage of Fouchy he had assumed many of the functions, if not the title, of the secretary; and he was d'Alembert's enemy. Maury remarks with some justice:

> Malgré la hardiesse qu'il avait laissé percer dans ses théories et qui lui avait valu d'être attaqué en commun avec les novateurs en pleine Académie française par le dévot Lefranc de Pompignan, il évitait de se compromettre par la fréquentation des philosophes, gens mal en cour et peu disposés à courber la tête sous le joug des opinions officielles. On comprend donc que Bailly, qui avait la même réserve calculée (Bailly, quoique lié avec les Encyclopédistes, avait refusé de prendre part à leur grande publication), qui, de plus, par ses spéculations sur les temps primitifs, appuyait le système adopté dans les *Epoques de la nature*, à l'auteur duquel il rendait un éclatant hommage, fût le candidat de Buffon. Esprit plus exact et plus sévère que le grand naturaliste, d'Alembert, auquel la géométrie avait donné une clarté et une énergie de conception et de style toute différente de la pompe de Buffon, méprisait les condescendances de son confrère et sympathisait peu avec le candidat de celui-ci; il devait naturellement préférer Condorcet, mathématicien comme lui, partisan avoué de la philosophie nouvelle, qui n'avait sans doute pas son génie, mais imitait de loin sa précision et son esprit.[17]

There are some implied inaccuracies in this passage. The *Epoques de la nature* did not appear until 1778, a year after Bailly's *Lettres sur l'origine des sciences*, and the development of thought in the two works can hardly have antedated the split in the Academy of Sciences. Moreover Maury forgets that Bailly, too, was a mathematician. In the main, however, he is right; the mental and temperamental affinity was between Buffon and Bailly on the one hand and between d'Alembert and Condorcet on the other. Each of the older men had a considerable following in the Academy, and each represented an important non-academic clique determined to win and hold the Academy: Buffon, the Court; d'Alembert, the *philosophes*. It was inevitably a blow to Bailly and the Court faction when Grandjean de Fouchy asked for Condorcet as an *adjoint*.

Perhaps it was the momentum of work already in hand; perhaps it was a desperate bid for favor; perhaps it was a determination to rise above the political bickering that led Bailly to produce one of his best scientific papers, the "Mémoire sur les inégalités de la lumière des satellites de Jupiter, sur la mesure de leur diamètre, et sur un moyen aussi simple que commode de rendre les observations comparables, en remédiant à la différence des vues et des lunettes."[18] Lalande, Laplace, Delambre, Arago—all the astronomers who have evaluated Bailly's work—are in accord on the excellence of this *mémoire*. Lalande wrote of it:

> Ce travail, plein de sagacité, ne pouvait être fait que par un de nos plus grands astronomes; et je lui disais, dans le temps de sa gloire, que j'aimerais mieux l'avoir fait que d'avoir été le premier sur la liste des présidents des Etats généraux et des maires de Paris, quoique son mérite l'y eût placé.[19]

The time of apparent eclipse of a satellite precedes the time of real eclipse, because the observer sees only the illuminated segment of the satellite. The apparent size of this segment varies with the brilliance of the satellite, the intensity of light on Jupiter, the distance of the satellite at Jupiter's limb, the height of the eclipse above the earth's horizon, the power of the telescope used and the observer's personal equation. Similarly the apparent end of the eclipse follows the real emergence. Grandjean de Fouchy had long before tackled the problem and offered a partial solution in these terms:

> Si cette partie visible était toujours de même grandeur, elle ne troublerait en rien le calcul, puisque ce ne serait qu'une quantité constante à ajouter au temps de l'émersion, et à soustraire au temps de l'immersion; mais cette moindre partie visible doit varier suivant l'intensité de la lumière des satellites. . . . Cette intensité doit varier 1° en raison inverse des carrés de la distance de Jupiter au soleil, 2° en raison inverse des carrés de la distance de Jupiter á la terre.[20]

In order to construct tables of error for the eclipses of the satellites, Fouchy devised an ingenious system for determining for a given position the time by which the real eclipse lagged behind the apparent eclipse. Using two telescopes of equal power, he applied to the objective of one a diaphragm of such dimensions that the two apertures were in the same ratio as the greatest and shortest distances of Jupiter from the earth; the

[15] Mérard de Saint-Just, 34–35.

[16] *Cf.*, for instance, Voltaire's somewhat exaggerated praise of Condorcet in a letter to the marquis May 4, 1774: " . . . je puis vous assurer que vos éloges de l'Académie des sciences éterniseront l'Académie et le secrétaire. Il n'y a qu'une chose de fâcheuse, c'est que le public souhaitera qu'il meure un académicien chaque semaine, pour vous en entendre parler."

[17] *L'Ancienne Académie des Sciences*, 167.

[18] MEM AC SCI 1771: 580–667.

[19] Eloge, 323.

[20] MEM AC SCI 1732: 423.

time lapse between the apparent eclipses observed with these two telescopes, he felt, should give the quantity of the equation for the invisible segment of the satellite. For forty years no further experiments were made, because, occupied with the secretariat of the Academy, Fouchy had neither the time nor the inclination to continue them. And his discovery was not put to use, because although he had indicated a method for establishing an equation, he had not determined the quantity.

Bailly says that he began to work on Fouchy's ideas as early as 1765.[21] Unlike Fouchy, he used a single telescope for his observations. By means of a diaphragm applied to the objective of the instrument, he diminished the aperture in the same ratio as Jupiter's greatest distance from the earth to its actual distance. When there was to be an eclipse of a satellite, he observed the moment of contact through the diminished aperture, then removed the diaphragm and timed the interval to the second or "true" contact. Such observations, conducted from 1768 on, enabled Bailly to confirm Fouchy's theory of the intensity of light, but showed no correlation between it and the equation of error for the eclipses.

Comme toutes ces formules supposent que l'on connaisse le diamètre des satellites et la grandeur du segment éclairé, qui devient insensible, il s'agissait de chercher les moyens de déterminer ces deux inconnues. J'ai pensé qu'on pouvait imiter, dans tous les moments, ce qui arrive dans les éclipses où la lumière diminue par degrés, et qu'en diminuant de même l'ouverture de la lunette, on parviendrait peut-être à faire disparaître le satellite.[22]

This eclipse-at-will was produced by a series of diaphragms of graduated size removed in rapid succession from the objective of the telescope. Bailly's first discovery as a result of this procedure was that the point of disappearance of the third satellite was at 1/64 its maximum intensity; for the other three, at 1/16; however he called the first satellite the largest and accounted for its lesser brilliance by its proximity to Jupiter.[23]

The measurement of the diameters of the satellites was in terms of their appearance from the center of Jupiter, and was determined by the time each takes to enter completely into Jupiter's shadow:

Ayant trouvé par l'observation le diaphragme qui fait disparaître le satellite, je connais le rapport du segment invisible au disque entier, au moment où le satellite disparaîtra; je couvre ensuite l'objectif de ma lunette d'un diaphragme un peu plus grand, qui me laisse apercevoir le satellite, mais faible et très petit, de manière que ce satellite cesse d'être visible dès que sa lumière sera tant soit peu diminuée. Je suis ainsi averti du moment où il commence à toucher l'ombre et l'intervalle de temps écoulé entre cet instant et celui de la véritable immersion me donne la mesure d'une grande partie du diamètre, d'où il est aisé de conclure le diamètre entier.[24]

Bailly supposed the area of the invisible portion of the satellite to be in inverse ratio to the square of the aperture, and he prepared a set of tables [25] for computing the true diameter from the observed diameter. A by-product of this research was the discovery that the equation of error varied in conformity with Bouguer's tables of refraction,[26] and Bailly computed his tables at two-degree intervals from the horizon to the zenith.

It followed from Bailly's formula for the invisible portion of the satellite that, if the invisible segment had a fixed relation with the light-gathering power of a telescope, the relative errors of different telescopes could be precisely determined. With this idea in view, Bailly and Messier [27] together conducted a series of experiments with both refracting and reflecting telescopes. They further compared the results of their observations to determine the personal factor affecting their timing. Bailly concludes his *mémoire* with a number of suggestions for standard observing practice, designed to reduce errors of the instrument and of the observer.

Although much of Bailly's work has been superseded and forgotten, there can be no doubt that it was extremely useful in its time. Bailly had not been able to make observations of the fourth satellite while working on this paper, and Lalande asked his permission to carry on his work in that field. Delambre and Maskelyne [28] continued the same line of investigation for a while, until it became apparent that basing the formula on the aperture of the diaphragm was not a sound procedure.[29]

We may note in passing that the summary of Bailly's long and painstaking paper which appeared in the history of the Academy for 1771 is unusually terse. The only word of praise is for Bailly's "recherches également ingénieuses et fines." The summary was written by Condorcet, who had officially become Secrétaire Perpétuel in February 1773, when Fouchy went into retirement.[30] The growing awareness of hostility in the Academy is apparent in Bailly's writings of this period. For one thing, he turned to a wider audience and, in due course, to a broader field of interest. Furthermore, he displays a new attitude of independence and self-justification bordering, in one case, on bitterness.

Sometime during 1772, Bailly wrote a detailed letter to the Royal Society, outlining his methods for the study of the light of Jupiter's satellites. This letter was read

[21] MEM AC SCI 1771: 581.

[22] *Ibid.*, 588.

[23] This is in accord with Galileo's findings, but contrary to modern knowledge, which makes the third and fourth satellites of approximately equal size and larger than the first and second.

[24] MEM AC SCI 1771: 615.

[25] *Ibid.*, 612–613.

[26] Pierre Bouguer (1698-1758), *Traité de la gradation de la lumière*, Paris, 1760.

[27] Charles Messier (1730–1817), astronomer and fellow-academician.

[28] Nevil Maskelyne (1732–1811), F. R. S., Astronomer Royal.

[29] Delambre, *Histoire de l'astronomie au 18e siècle*, 745 ff.

[30] The volume for 1771 was published in 1774.

before the Royal Society February 18 and 25, 1773, and published in the *Philosophical Transactions* for that year [31] together with "Notes on the foregoing paper" by the Reverend Samuel Horsley,[32] who, expressing certain reservations on matters of detail, nevertheless voices the highest opinion of Bailly's work.

Immediately after Condorcet's elevation to the secretariat, Bailly brought into the open a personal quarrel with Lalande which had been brewing for seven years but which he had obviously been reluctant to publicize so long as there was any chance of becoming the Academy's secretary. The subject of this quarrel was the claim of priority of discovery which Lalande had published in connection with the librations of the nodes and the variations in the inclinations of the orbits of Jupiter's second and third satellites. Bailly had read two papers on the subject in 1765 and 1766 and dealt with it at length in the *Essai sur la théorie des satellites de Jupiter* of 1766. Lalande several times asserted [33] that he had discovered the principle involved in these variations and that Bailly, who had merely added observations and details, had made use of this discovery without giving credit for it. The immediate cause of Bailly's breaking his silence was the publication of a letter from d'Agelet [34] to Bernoulli [35] in the latter's *Recueil pour les astronomes*. D'Agelet referred to the variation of the second satellite as "une découverte qui appartient incontestablement à M. de Lalande."

Bailly replied with an open letter to Bernoulli, dated April 15, 1773, which appeared in the *Journal encyclopédique* for June 1, 1773.[36] He explained with much detail and considerable restraint the basis of Lalande's claim and the grounds for his own claim. Lalande pointed to his "Remarques sur la cause du mouvement observé dans les nœuds du troisième et du quatrième satellites de Jupiter" [37] as proof of his priority. Bailly replied that the only significant theoretical remark in this paper was contained in the last four lines, where Lalande had written:

> De ce mouvement des nœuds il résulte nécessairement une variation dans l'inclinaison que j'espère discuter dans une autre occasion, en parlant de celles des planètes qui éprouvent de semblables inégalités. Voyez mon *Astronomie*, I, p. 519.[38]

But the passage in the *Astronomie* referred to is no more explicit than the *mémoire* itself. In contrast with Lalande's vague promises to discuss the matter, Bailly could point to two sound, scholarly publications. Clearly, his case is the stronger of the two. The conclusion of the letter is a mixture of dignity and injured pride, attitudes which were to become characteristic of Bailly's defensive utterances during the Revolution:

> Si je n'ai rien répondu jusqu'ici, c'est que je croyais superflu de répondre. . . . Mais quand je lis dans la lettre qui vous a été écrite que "la cause des variations de ces inclinaisons est une découverte importante, une des remarques les plus curieuses que l'on ait faites depuis vingt ans dans l'astronomie," je reçois avec reconnaissance ces éloges que je ne croyais pas dus à un travail dont j'avais une opinion plus modeste. On ne dira point que je les ai mendiés. Au reste, la satisfaction que j'éprouve en goûtant cet encens est bien pure; il ne m'était pas adressé; j'en jouis comme anonyme. C'est avec regret que j'ai pris la plume contre M. de Lalande. Un pareil procès était d'autant plus inutile que les pièces justificatives de part et d'autre étant imprimées et déposées dans nos ouvrages, le public pouvait juger sans que nous plaidassions devant lui. M. de Lalande m'y a forcé; je lui ai répondu une fois, et je rentre dans le silence dont je suis malgré moi sorti. . . .[39]

Bailly kept his promise; there were no further polemics; and there is no evidence that the split between the two astronomers continued. Lalande was probably responsible in part for Bailly's joining the Masonic order, and his *éloge* of Bailly written after the latter's death certainly shows that no ill will existed on either side. However, Lalande had the last word in the matter. In his *Bibliographie astronomique* of 1803 appears the following remark:

> La découverte que j'avais faite de la cause des changements d'inclinaisons dans les orbites des satellites, et dont il se servit sans me nommer, occasionna entre nous une querelle littéraire dans laquelle il sortit de son caractère en publiant une lettre contre moi . . . ; mais dans son *Histoire de l'astronomie* (Moderne), III, p. 180, il a exposé mes droits avec la candeur qui lui était naturelle.[40]

This sweet forgiving is all the more touching because Bailly did no such thing, as a glance at the *Astronomie moderne* will prove. What Bailly really did was repeat his arguments from the letter to Bernoulli and add pointedly: "Ce n'est pas à nous à prononcer; le public jugera sur les titres." [41]

These episodes are indicative of Bailly's growing independence of the Academy of Sciences. He had been introduced to it as a young man under the tutelage

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[31] A letter to the Rev. Nevil Maskelyne . . . containing a proposal of some new methods of improving the theory of Jupiter's satellites, translated from the French with the original underneath, in *Philosophical Transactions* **63** (1): 185–212, 1773. The letter is not dated but is clearly a résumé of the *mémoire* of November 13, 1771, from which it may be assumed that it was written during the intervening year.

[32] Samuel Horsley (1733–1806), F. R. S., astronomer, prelate and author.

[33] MEM AC SCI 1765: 605; *Journal des savans* 1766; *Astronomie* (2nd ed.) **3**: 263.

[34] Joseph Le Paute d'Agelet (1751–1786), a provincial astronomer who died on the ill-fated expedition of La Pérouse to Oceania.

[35] Jean Bernoulli or Bernouilli (1744–1807), grandson of the more famous Jean Bernoulli. Born of an illustrious family of mathematicians, the younger Jean was a child prodigy and a member of the Academy of Berlin at nineteen. He was astronomer royal to the King of Prussia.

[36] *Journal encyclopédique* **4** (2): 309–319.

[37] MEM AC SCI 1762: 230.

[38] *Ibid.*

[39] *Loc. cit.*, 318–319.

[40] *Op. cit.*, 731.

[41] ASTR MOD **3**: 180.

of Lacaille and Clairaut, and it had been, as it were, a second home to him. Mérard de Saint-Just's figure of speech is a trifle more colorful: "Il ne manquait que bien rarement aux assemblées de l'Académie des sciences. . . . Bailly l'aimait comme on aime une première maîtresse."[42] Nevertheless, from the period of the first d'Alembert-Buffon affair Bailly begins to find new loves, and the first of these was Chaillot.

One local historian[43] says that Bailly bought his house in Chaillot about 1758, but this is unlikely, considering Bailly's age at that date, his apparent lack of independent income, and his predilection for the family circle. More plausible is Mérard de Saint-Just's explanation of how Bailly came to Chaillot:

> Il ne composait guère à Paris; aussi y passait-il peu de temps; il y restait à peine quatre mois. Pour être davantage avec lui-même, dès les premiers jours d'avril il retournait à Chaillot où sa mère avait une maison de campagne.[44]

We know that Jacques Bailly was a poet and playwright and, some of his biographers have said, a sometime actor. Chaillot was a fashionable suburb of Paris which attracted successful artists and writers. Mme Molé of the Comédie Française lived at 82, rue de Chaillot until 1767; Malfilâtre, the poet, lived there until his death, under the assumed name of La Forêt; Talma lived there in his youth; Carlin (C. A. Bertinazzi), the famous harlequin of the Comédie Italienne, had a villa in Chaillot; and nearby, at Passy, within easy walking distance, lived Alexis Piron, poet and dramatist.[45] It is not surprising, then, to find the elder Bailly attracted to Chaillot, and it would seem reasonable to suppose that Jean-Sylvain's parents had owned the house for a number of years, that he or his mother inherited it after his father's death (1768) and that it was the logical place to retire when he wanted to write. Chaillot had all the advantages of the country without being isolated from the city. It can scarcely have taken Bailly more than forty-five minutes to travel on foot to the weekly meetings of the Academy held at the Louvre.

The house itself, demolished about 1864 or 1865, is described by Victorien Sardou in a letter of November 24, 1898, as he remembered it when he visited there about the middle of the century:

> Elle portait le numéro 21 sur la rue de Chaillot et consistait en un corps de logis d'aspect bourgeois, style Louis XVI, entre cour et jardin; un rez-de-chaussée auquel donnait accès, du côté de la cour, un perron de dix à douze marches; un premier étage, surmonté par un comble, où se trouvait les chambres des domestiques; et une petite aile basse, en forme de galérie, faisant saillie sur le jardin à droite du corps de logis. La cour était spacieuse; le jardin, grand, fort agréable.[46]

The move to Chaillot introduced Bailly to a new, non-academic atmosphere, that of the salons and the world of letters. From the 1730's onwards Chaillot and Passy had counted among their inhabitants the widow of Philippe II d'Orléans; Servandoni, the architect and painter; Vanloo, painter to the King of Prussia; Mme de Tencin; the abbé Prévost, etc. About 1770 the tone of these communities became rather more *philosophe*. Mme Helvétius established her salon at 59, rue d'Auteuil in 1772; six years later Cabanis came to live with her as her adopted son; Franklin moved to 1, rue Singer in 1777; Mme Vigée-Lebrun, the portraitist, spent her summers at Chaillot during the 70's; and Mlle Guimard of the Opera, Marie-Joseph Chénier and Mirabeau moved to Passy shortly before the Revolution. One of Bailly's more interesting—and closer—neighbors was Guillaume Debure, printer, publisher, and bibliographer who, from 1775 onwards, was to be Bailly's almost exclusive agent.

The first years at Chaillot Bailly seems to have spent largely in study and writing, but Bailly was no recluse. He became a frequenter of the salon of Fanny de Beauharnais[47] through whom he probably met Cubières,[48] Dussaulx,[49] and Mérard de Saint-Just.[50] He became a close friend of Mme Gaye whom he was later to marry. The friendship that developed with Franklin was probably responsible for his ultimate affiliation with the Loge des Neuf Sœurs. These were happy and fruitful years during which Bailly meditated and produced the four volumes of ancient and modern astronomy which are by far his closest approach to greatness and his most enduring monument.

About the time of Bailly's retirement to Chaillot, we can detect a change in his thinking which was, for a time, to widen the gap between him and the *philosophes*. Bailly seems always to have needed a guide and mentor—first Lacaille, then Clairaut, d'Alembert, and

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[42] *Op. cit.*, 167.

[43] Doniol, 140. This assertion is repeated in Léopold Mar, "Quelques documents sur l'ancien Chaillot: Notes sur Bailly" in Société historique d'Auteuil et de Passy, *Bulletin* **4**: 288–289.

[44] *Op. cit.*, 32.

[45] Société historique d'Auteuil et de Passy, *Bulletin* **1**: 197 and **2**: 18.

[46] *Ibid.* **3**: 118–119.

[47] Marie-Anne-Françoise Mouchard, comtesse de Beauharnais (1728–1813), aunt by marriage of the Empress Josephine, was the author of numerous plays, novels and poems which have dropped into complete obscurity. One of her critics composed the following epigram about her:

> Eglé, belle et poète, a deux petits travers:
> Elle fait son visage et ne fait pas ses vers.

Her salon was much in vogue during the latter part of the century.

[48] Michel de Cubières (1752–1820), known also as Dorat-Cubières and de Palmézeaux, dramatist and poet, edited Bailly's posthumous *Recueil de pièces intéressantes* (1810). He, too, was the butt of ridicule as a "monsieur . . . qui, ne pouvant changer d'esprit, avait l'habitude de changer de nom." (Lefèvre-Deumier, 302.)

[49] Jean Dussaulx (1728–1799), translator of Juvenal, member of the Académie des Inscriptions. For his relations with the Bailly family, see *infra*, pp. 508, n. 48, and 513.

[50] Simon-Pierre Mérard de Saint-Just (1749–1812), the earliest (1794) and most reliable of Bailly's biographers.

Buffon. The first two directed his efforts in the fields of astronomy and mathematics; d'Alembert and Buffon enocuraged him in the literary field. When he turned to the popularization of astronomy, he came under the influence of Court de Gébelin [51] whose nine volume *Monde primitif* was just appearing. This work was an attempt to reduce the complexities of civilization, its customs, traditions, speech, etc. to a universal theme. Court de Gébelin felt that the key to the mysteries of nature was to be found in the history of antiquity and that history, properly understood, might lead humanity to a new golden age. His vision of *le grand ordre* was utopian, and much of his history is inaccurate; but in many ways Court de Gébelin was a precursor of modern thinkers. His theory of fables as allegorical documents foreshadows the work of modern folklorists. Similarly his search for the primitive language which was the source of all languages anticipated the linguistic research of the nineteenth century.

If Bailly had acquired from his astronomical research a conviction that truth was basically simple, he had also learned from Leibnitz to substitute "vraisemblance" for "la vérité inaccessible." The influence of Court de Gébelin was to encourage this speculative bent and cause Bailly to be branded "frère illuminé" by the more ardent *philosophes*. Yet the illuminism of Bailly's work, if it can be called that, is not so far removed from the rationalism of his detractors, but is rather symptomatic of the deterioration of systematic doubt which was common towards the end of the century.

[51] Antoine Court de Gébelin (1725–1784) was a Protestant minister, born in Languedoc and exiled to Lausanne, who gave up his calling and came to Paris about 1760 to write. During the same years that he was writing the *Monde primitif* (1773–1782), he was royal censor and in close contact with the economists and physiocrats, especially Quesnay. He was secretary of the Loge des Neuf Sœurs (1778–1781); he co-edited with Franklin and Robinet the propaganda periodical *Les Affaires de l'Angleterre et de l'Amérique* (15 vols., Paris, 1776 ff.); and he served as first president of the Musée (1780–1784), which was the public forum of the Neuf Sœurs.

IV. THE GRAND ORDER

The history of ancient astronomy, letters on the origin of the sciences, the Loge des Neuf Sœurs

> La recherche des connaissances des anciens est le premier pas d'un peuple qui marche vers la lumière; c'est par eux que l'on pense, c'est leur langue qu'on approfondit; les hommes habitent des tombeaux, ils en tirent laborieusement des décombres, et chaque débris semble une découverte importante. Le génie vient ensuite profiter de leur travail et s'emparer de leur gloire. Mais leur triomphe subsiste quelque temps à côté du sien. . . .
>
> Bailly, *Eloge de Molière.*

If Bailly was a "frère illuminé," so were an amazing number of his contemporaries. The period before the Revolution offers the spectacle of monstrous hocus-pocus in ostensibly rational circles. Viatte has pointed out[1] the rapid multiplication of mystical societies, *assemblées pieuses,* clubs, fraternal organizations, and theosophic groups based largely on "la science de Dieu" and the cult of antiquity. The slim bond of illuminism brought together such dissimilar persons as Philippe d'Orléans, Swedenborg, Lavater, Court de Gébelin, and Saint-Martin; at one time or another Mme de Staël, Grimm, Raynal, the Rolands, and Volney were swayed by it.

> L'illuminisme forme plutôt un ensemble de tendances qu'un système arrêté; des analogies purement "littéraires" se substituent à l'unité philosophique. Médiocres logiciens, les mêmes auteurs s'accommoderont de principes que nous jugerions contradictoires. Cependant ils disent s'entendre. Leur formation les met d'accord sur quelques idées essentielles. Caro, dans son *Essai sur Saint-Martin,* en formule plusieurs: "A l'origine de toutes choses, l'unité. . . . [Puis] l'émanation commence; elle ne s'arrêtera plus. Alors naissent ces myriades de natures intelligentes . . . irradiations de la vie divine. . . . L'homme est un de ces êtres émanés. . . . La préexistence des âmes dans cet homme verbe, sa séparation de l'unité, sa corporisation, son exil, son retour à l'unité . . . ; sa transformation en Dieu . . . le symbolisme et la théorie des nombres, la théurgie et la possession du monde invisible par la magie ou par l'amour complètent cet ensemble de dogmes invariables. . . . Le panthéisme est au terme de tous ces systèmes."[2]

By these standards, the strongest single force for illuminism in the eighteenth century was Freemasonry. At the roots of Freemasonry were this same pantheism, this same unshakable belief in the power of the *Word* and of *Numbers* and in the ability to possess the world, visible and invisible, through science and love. The key word of the Masons was *Unity.*

During the 70's and the 80's Bailly toyed with illuminism. It would be unjust to suggest that he ever really abandoned the scientific method, but he sometimes used the scientific method to prove remarkable theses. Like Volney, Dupuis, and Boulanger, he strayed among the illuminati, attracted by their explanations of oriental antiquity, by their system of "correspondance" and by the Hermetic philosophy. Like them, he found in mythology and ancient history the vestiges of monotheism which, far from disproving the authority of Genesis, served to confirm it. He was attracted more and more by the concept of the grand order which Court de Gébelin was elaborating during this period and ultimately found his way into the Masonic order, in a lodge where the philosophies of Voltaire, Franklin, and Court de Gébelin seemed to be reconciled. The books which Bailly wrote during this period are not the results of illuminism, but a parallel trend which closely approached it.

The marriage of Freemasonry, erudition, and illuminism can best be shown in a remarkable passage from Court de Gébelin's last work. In it he expresses the fanaticism of the utopians, founded on the scientific study of history, law, and language. This is the doctrine of the grand order which was to save all nations and make all men brothers. This passage may well be regarded as one of the most valuable documents of the pre-Revolutionary period in France:

> Nous publierons plutôt l'histoire de l'humanité que celle des hommes, les fastes de l'univers, plutôt que ceux des nations isolées. Ce ne sera pas l'histoire de tel peuple ou de tel siècle, ce qui importe peu ou ne peut amuser que les oisifs; ce sera l'histoire de tous les peuples, de tous les siècles, parce qu'on remontera aux principes mêmes de l'histoire. . . . Nous ferons voir que tous les peuples qui ont prospéré . . . ne devinrent florissants qu'autant qu'ils furent attentifs à la voix de l'ordre et dociles à ses leçons; qu'aucun législateur ne fut véritablement grand et utile à ses contemporains et au monde qu'autant qu'il connut l'ordre et qu'il sut en rapprocher ses lois. . . . Ici, nous avons eu l'avantage d'être aidés par une philosophie pleine de sens et de raison, que nous avons rencontrée heureusement sur notre chemin, tandis que nous cherchions quelles pouvaient être les causes de ces phénomènes, en apparence si bizarres, que nous présentait l'antiquité historique. . . . Nous trouvâmes sur nos pas des Chercheurs de vérité, des Hérauts de l'Ordre, qui faisaient pour les sociétés, pour les empires, ce que nous faisions pour les langues, ce que nous cherchions pour les peuples; qui remontaient aux causes de la prospérité et de la décadence des nations, qui disaient: "Tout a sa cause immuable et éternelle. . . . " Le plus simple énoncé de cette sublime philosophie fut pour nous un flambeau divin, une source rayonnante de vérité: le complément de nos recherches et de nos travaux. . . . Ici . . . nous trouvions . . . un système admirable, tendant au même but et découvert par une toute autre route. Ce système et le nôtre se sont donc unis comme deux moitiés en un tout; nous l'avons regardé comme notre propre bien; nous nous en sommes approprié tout ce qui nous convenait, et nous avons laissé

[1] *Les Sources occultes du romantisme* **1**, *passim.*
[2] *Ibid.* **1**: 37.

ce système circuler dans l'univers avec un succès plus ou moins favorable, suivant que les Esprits étaient plus ou moins disposés, que les petites passions humaines étaient plus ou moins en jeu: à cet égard, nous n'avons été que spectateurs: nous ne pouvions être acteurs ou agents: mais nos vœux ont toujours été pour son plein et entier succès: lui seul peut sauver les nations; lui seul peut faire de l'Europe une assemblée de frères; et de l'univers, un tout lié par les mêmes droits, soutenu par les mêmes devoirs, heureux par les mêmes jouissances, ayant ainsi le même langage, celui de l'Ordre, sans lequel rien ne peut subsister, et base essentielle de toute législation.[3]

This "sublime philosophy" was Freemasonry, the panacea of social, economic, and political ills—a doctrine which, properly understood and applied, would establish the reign of order. Court de Gébelin, although preaching the dogma of progress, claimed that "nothing of the past had disappeared because all the past was still alive in the present and could easily be discovered by a perspicacious mind."[4] In his unpublished *Plan d'un cours de religion* he wrote: " . . . en examinant attentivement les noms de ces Hélion (de Sanchoniaton), de ces Bérouth, de ces Jupiter, de ces Cœlius, etc., on avait précisément la même histoire que donne Moïse."[5] In his essay on the prophet Daniel, he offered an astronomical interpretation of Daniel's prophetic numbers, concluding: "Il est d'autant plus étonnant que personne ne s'en soit aperçu, qu'il suffisait pour cela de comparer le livre de la nature avec celui de la révélation."[6] A firm believer in the oneness of truth, Court de Gébelin was constantly at pains to reconcile all orders of knowledge and to put scientific interpretation on primitive myth and allegory. Man, once master of the universe, had lost his mastery through sin and ignorance. The Christian era marked the beginning of his renewed sovereignty. "Une fois la science véritable restaurée—et Court de Gébelin se flatte que ses travaux en hâteront l'heure—rien n'empêchera l'âge d'or que prépare le progrès des connaissances humaines."[7]

Bailly, like Court de Gébelin, was a devotee of the grand order; the quotation prefixed to this chapter—"La recherche des connaissances des anciens est le premier pas d'un peuple qui marche vers la lumière"—is an indication of how early this concept was forming in his mind. His respect for antiquity was exaggerated, and he was frequently deluded by the belief that primitive man had reached a state of knowledge equal or superior to that of modern man. His professed belief in progress is therefore qualified by the suspicion that progress consisted in re-attaining a level already reached in the remote past.

In 1775 Bailly published a large quarto volume entitled *Histoire de l'astronomie ancienne, depuis son origine jusqu'à l'établissement de l'école d'Alexandrie.* This was followed in 1779 by two more volumes in the same format entitled *Histoire de l'astronomie moderne depuis la fondation de l'école d'Alexandrie jusqu'à l'époque de 1730.* A fourth volume appeared in 1782: *Histoire de l'astronomie moderne depuis la fondation de l'école d'Alexandrie jusqu'à l'époque de 1782.* These, together with the *Traité de l'astronomie indienne et orientale, ouvrage qui peut servir de suite à l'histoire de l'astronomie ancienne* of 1787, constitute a 3,000-page panorama of the long and slow development of the corpus of modern knowledge.[8] Despite the imaginative speculation of the first volume and the errors of fact in the last one, the work as a whole deserves a prominent place among the histories of science.

L'ouvrage a de la beauté comme édifice, comme monument; il est d'une grande ordonnance. . . . Il faut y voir . . . une noble construction, conçue en l'idée et en présence de l'*Histoire naturelle* de Buffon: des discours généraux en tête, puis une narration suivie, faite pour être lue et, jusqu'à un certain point, entendue de tous, des gens du monde comme des savants; la discussion des faits, les preuves ou éclaircissements étaient rejetés dans une seconde partie du volume, plus particulièrement destinée aux astronomes et aux savants, mais nullement inaccessible au reste des lecteurs, pour peu qu'il fussent attentifs et curieux.[9]

The genesis of this history is not immediately apparent. Among the papers left by Bailly at the time of his death and later published by Cubières as the *Recueil de pièces intéressantes* are several long extracts from Jean-Etienne Montucla's *Histoire des mathématiques* (2 v., Paris, Jombert, 1758). Montucla was much concerned with astronomy as a science intimately bound up with mathematics, and several hundred pages of his history, in the form of interstitial passages, are devoted to its development, especially during the sixteenth and seventeenth centuries. Montucla's history was one of Bailly's sources for the *Eloge de Leibnitz* in 1768. It is not unlikely, however, that Bailly knew the work from the time of its publication ten years earlier, as that date corresponds with his first studies in astronomy and mathematics under Lacaille. Indeed, Lacaille may have suggested it to him as a model for imitation, for in his eulogy of the abbé Bailly remarks that, had he lived, "Lacaille eût été l'historien qui manque à l'astronomie."[10] Perhaps, then, Bailly felt that he was continuing the work of his teacher.

[3] *Monde primitif* **8**: lviii–lxi.
[4] Faÿ, *Revolution and Freemasonry*, 271.
[5] Quoted in Viatte **1**: 187.
[6] *Monde primitif* **8**: 99. According to Gébelin the numbers 2300 and 1260, as well as their difference 1040, are perfect cycles which harmonize the solar year, the lunar month and the day.
[7] Viatte **1**: 187.
[8] These titles and dates are cited in the text in order to avoid the general confusion of dating which arises from the appearance of second editions. The three volumes of the *Astronomie moderne* are numbered consecutively 1 to 3. The *Astronomie ancienne* and the *Astronomie indienne* are not numbered. Complete descriptions of the various editions will be found in the bibliography.
[9] Saint-Beuve, *Causeries du lundi* **10**: 348-349.
[10] DISC MEM **1**: 176.

Another contributing factor may have been Bailly's contact with Legentil. Although Legentil was away from Paris for a decade, it was his chair that Bailly had occupied first in 1763 and again in 1770. After Legentil's return, the two worked together as observers,[11] and Bailly must have been moved by the enormous fund of ancient knowledge which Legentil had discovered in India[12] to which Bailly makes frequent reference. Bailly probably had access to Legentil's manuscript notes, for he refers in the history of ancient astronomy to "la relation de son voyage qui va paraître incessamment."[13] The example of Buffon's *Histoire naturelle* mentioned by Sainte-Beuve would seem an important one in view of the relations already noted between Bailly and Buffon. But, although this work had been appearing since 1749 and Bailly had every opportunity to be familiar with it, it must be pointed out again that the most significant volume, *Les Epoques de la nature,* appeared after Bailly's main line of thought had already evolved. In fact, Mérard de Saint-Just suggests that the borrowing went in the other direction: "Buffon en adoptant les idées de Bailly n'eût pas dû se dispenser de déclarer qu'il les lui devait. Cependant il les présenta au public comme étant les siennes."[14] In any case, there are only four references to Buffon in the first volume of Bailly's history.

Legentil's return from India coincided with a literary event of some moment which may have had a decisive influence on Bailly—the publication of Anquetil's translation of the *Zend-Avesta.*[15] This book followed closely on the first French translation of the *Shaster.*[16] Together they served to stimulate the growing interest in oriental and ancient culture, and much of the information contained in them has found its way into Bailly's writings.

It is reasonable to assume, then, that Bailly had for some years (possibly since his first contact with Lacaille) meditated a large-scale work on the history of astronomy and perhaps compiled notes with that in mind, that the defeat in the struggle for the secretariat of the Academy and subsequent retreat to Chaillot provided the leisure and inclination to write such a work, and that the return of Legentil and the appearance of several oriental texts of great antiquity filled Bailly with a determination to start his account with the very earliest beginnings of man's history. The concatenation of circumstances would put the *terminus a quo* of composition around 1770–1771. The first mention of the history appears in Bailly's *mémoire* of August 18, 1773.

In the "Discours préliminaire" which precedes the *Histoire de l'astronomie ancienne,* after pointing out the general utility of the science of astronomy for chronology, geography, navigation, etc., Bailly suggests that it is also a weapon of the *philosophe* against superstition and ignorance and, in a sense, the yardstick of the progress of human understanding.

> L'astronomie . . . en agrandissant l'univers . . . a agrandi l'idée de l'intelligence suprême; elle a donné de l'étendue à l'esprit humain, qui, comme Alexandre, se trouvant trop serré dans le globe qu'il habite, aime à s'égarer de sphère en sphère, et à mesurer du moins par l'imagination cette étendue immense, dans laquelle l'homme occupe un si petit espace! . . . L'astronomie a successivement reculé ces bornes. Elle a fait voir que le soleil est douze cent mille fois plus gros que la terre; elle a placé cet astre à trente-quatre millions de lieues; Saturne, la plus éloignée des planètes, à trois cent vingt millions. Elle a dit: la distance des étoiles se refuse à mes mesures, et tout ce que je puis répondre à la curiosité humaine, c'est que l'orbite de la terre, dont le circuit a deux cent dix millions de lieues, cet espace si grand, vu des étoiles les plus proches, ne peut paraître que comme un point! Que l'imagination juge de la distance de ces étoiles, et de celles qui étant plus petites semblent plus éloignées. Que la raison pense, comme il est naturel de le penser, que ces étoiles sont autant de soleils, qui ainsi que le nôtre ont des planètes qui circulent autour d'eux; une infinité de comètes qui nagent dans l'espace et qui remplissent ce vide établissent une espèce de communication et de chaîne entre ces systèmes si éloignés. Qu'elle ajoute à ce spectacle magnifique la connaissance de la simplicité des lois prescrites à cet univers si imposant et si vaste; et elle aura l'idée de l'étendue, de la puissance de la nature, et de la grandeur de l'Etre suprême.[17]

Bailly's vision of the universe is comparable to Pascal's description of the two infinites in the *pensée* on the disproportion of man. But one wonders whether for Bailly the "Etre suprême" was not a comforting designation for a set of mechanical principles which govern but do not explain the phenomena of nature.

Arago says that, when Bailly said he was going to begin with the origin of astronomy, one might have expected several pages of imaginative writings, but no one could have been prepared for a chapter entitled "De l'astronomie antédiluvienne." This chapter is, however, not quite so speculative as one might suppose from the title alone; it is a hypothetical reconstruction based on an extensive examination of available information. In it Bailly concludes that the scientific knowledge, and more especially the astronomy, of the ancient world represented the remains of a civilization rather than its beginnings. "Quand on considère avec attention l'état de l'astronomie dans la Chaldée, dans l'Inde et à la Chine, on y trouve plutôt les débris que les éléments d'une science."[18] The first thing that struck

[11] The observation of the lunar eclipse of September 30, 1773, is a case in point.

[12] Reported in two "Mémoires sur l'Inde," in MEM AC SCI 1772 and 1773, and in the *Voyage dans les mers de l'Inde,* 2 v., Paris, 1779–1781.

[13] ASTR ANC, 330.

[14] *Op. cit.,* 189.

[15] Abraham-Hyacinthe Anquetil-Duperron, *Zend-Avesta,* 3 v., Paris, 1771.

[16] John Zephaniah Holwell, *Evénements historiques, intéressants, relatifs aux provinces de Bengale et à l'empire de l'Indostan . . . ouvrage . . . traduit de l'anglais,* Amsterdam, Arkstée et Merkus, 1768.

[17] ASTR ANC, xxi–xxii.

[18] *Ibid.,* 18.

Bailly was the almost universal evidence that the first recorded observations of Egyptian, Chaldean, Persian, Indian, Chinese, and Tartar astronomers seemed to date from within a century of the year 3000 B.C.[19] From the extremely advanced notions of this early astronomy, from the accurate, lengthy, and painstaking observations which such notions presuppose, and from the complementary aspects of the astronomies of the various peoples of antiquity, he deduced a common source of knowledge [20] and a period of at least 1,500 years of development prior to the first recorded observations.[21] Astronomy is:

> . . . l'œuvre d'un peuple antérieur, qui avait fait sans doute en ce genre des progès, dont nous ignorons la plus grande partie. Ce peuple a été détruit par une grande révolution. Quelques unes de ses découvertes, de ses méthodes, des périodes qu'il avait inventées, se sont conservées dans la mémoire des individus dispersés.[22]

The following represent for Bailly the community of knowledge of the ancient world:

1. The fact that Egyptians, Indians and Chinese used the names of the seven known planets (i.e. sun, moon, and five planets by modern reckoning) to denote the seven days of the week, and that they used them in the same order.[23]

2. The use of the same periods for reckoning: 18 years 11 days for the prediction of eclipses; 19 years for feasts and sacrifices (especially Neomeniæ); [24] 600 years for the reconciliation of lunar and solar periods.[25]

3. The habit in India, China, and Egypt of intercalating five days yearly in a 360-day calendar, and one additional day every four years with the exception of one day every 150 years.[26] (This is substantially the plan of the modern bissextile year.)

4. The universal use of the sexagesimal system [27] of which we retain vestiges in modern usage. (Why 360° in a circle or 60 minutes in an hour?)

5. The zodiac, common to all peoples of Europe and Asia, with its dual system of 12 signs and 28 constellations.[28]

6. Evidence that Tartars and Indians at least had correctly measured the precession of fixed stars.[29]

The belief that the correct measurement of the earth's circumference was known to antiquity,[30] the fact that the Indians claimed to know fifteen planets, that they described accurately details of the moon not visible to the naked eye, that they knew the Milky Way to be composed of individual stars, and that they correctly identified comets under their different aspects, although they had no scientific instruments with which to make such observations; [31] these and other "facts" Bailly regarded as evidence that the era 3000 B.C. was "l'époque de la renaissance de l'astronomie, et non pas de son origine." [32]

> Ces méthodes savantes, pratiquées par des ignorants, ces systèmes, ces idées philosophiques, dans les têtes qui ne sont point philosophes, tout indique un peuple antérieur aux Indiens et aux Chaldéens; peuple qui eut des sciences perfectionnées, une philosophie sublime et sage, et qui, en disparaissant de dessus la terre, a laissé aux peuples qui lui ont succédé quelques vérités isolées, échappées à la destruction, et que le hasard nous a conservées. Ainsi l'antiquité, si célèbre par plusieurs nations savantes, n'offre depuis les Chaldéens et les Indiens jusqu'à Hipparque que les débris des connaissances de ce peuple dont le nom même est inconnu aujourd'hui.[33]

Aware of the implications of his own belief in the singleness of truth and the multiplicity of error, Bailly goes on to examine what may be described as the community of error among the ancients.

> Car l'homme toujours semblable à lui-même par ses goûts et ses sensations diffère par ses conceptions et ses idées; il n'a de point commun que la vérité. Les chemins de l'erreur sont infinis; ils sont infiniment divergents. Les hommes ne peuvent s'y rencontrer que quand ils sont partis ensemble du même point.[34]

Bailly thus feels that corresponding superstitions, prejudices, misconceptions, fears, tabus, and ritualistic practices among the ancients tend to confirm the com-

[19] *Ibid.*, 12–16.
[20] *Ibid.*, 16–18.
[21] *Ibid.*, 21.
[22] *Ibid.*, 19.
[23] *Ibid.*, 62–63.
[24] *Ibid.*, 65–66. 19 Julian years equal 235 synodic months (i.e. 235 × the period between conjunctions or oppositions of the sun and moon). Hence, in nineteen years the conjunction or opposition of sun and moon will recur on the same day of the same month. This is the Metonic cycle, "discovered" by Meton *circa* 433 B.C. and still used to fix the observance of Easter. See Russell, Dugan and Stewart, *Astronomy*, 2 v., Boston, Ginn, 1926–1927, **1**: 160.
[25] Cassini identified the 600 year period as one in which 7,421 lunar revolutions of 29 days 12 hrs 44 m 3 s equal 219,146½ days or 600 years of 365 days 5 hrs 51 m 36 s (or within 3 minutes of the modern tropical year). Bailly felt that the 600 year period could have been determined only by consecutive observation for that length of time and confirmed only by repeating the observations for a second such period. (ASTR ANC, 21, 65–66.)
[26] ASTR ANC, 69–70.
[27] *Ibid.*, 70–71.
[28] *Ibid.*, 73–74. Bailly points out (ORIG SCI, 139) that this division of the heavens is not a "natural" one and that the Mexican Indians had evolved a totally different system.
[29] The evidence is extremely tenuous. The product of two periods (144 years in the Indian tables, 180 years among the Tartars) which serve no apparent astronomical purpose is 25,920 years, or an approximation of the period required for the vernal equinox to make a complete circuit of the heavens. (ASTR ANC, 76–77.) Newcomb, 1925, estimates the annual precession at 50.2619″ and the period at 25,784 years.
[30] ASTR ANC, 77–79. This supposedly accurate measurement is based on a re-evaluation of the stade by Joseph-Nicolas de l'Isle (MEM AC SCI 1721: 60), Nicolas Fréret (MEM AC INSC **24**: 504) and Bailly himself. For Bailly's further research in linear measure, see *infra*, pp. 462 and 470.
[31] ASTR ANC, 83.
[32] *Ibid.*, 16.
[33] *Ibid.*, 87–88.
[34] *Ibid.*, 85.

mon source postulated on the community of knowledge.

Natural human curiosity, of course, demands the pin-pointing of this common source, but Bailly at first moved cautiously. He felt that, where history failed, legend and mythology might offer a clue. "On doit respecter la tradition sans l'adopter toute entière; . . . mais toute enveloppe a un noyau qui lui sert d'attache, et ce noyau, c'est la vérité historique." [35] With some reservations, he accepted the legendary founders of China, Egypt, Persia, and Babylon as real persons.[36] These nations represented outposts of a full-fledged civilization, and their founders (Fu-Hi, Thoth, Zoroaster, and Belus) were pioneers, leaders of migrating populations. The parent race, he suggested casually, might be the Atlanteans, reported by Plato and Diodorus of Sicily as the people of greatest antiquity; [37] and the era of Uranus (*circa* 3890 B.C.) might represent the break-up of Atlantis and the beginning of the migrations.[38] Bailly thus far accepted the Atlantis explanation only as a symbol of the prototype civilization which he was convinced had existed. He was not concerned with the geographical location assigned to Atlantis by Plato. On the contrary, he observed: "Une chose très remarquable, c'est qu'il semble que les lumières soient venues du nord, contre le préjugé reçu que la terre s'est éclairée comme elle s'est peuplée du midi au nord." [39]

This idea evolved from the comparison of a number of works of physics, natural history, astronomy, travel, mythology, and history. It was based on the acceptance of Buffon's theory of the origin of the earth, whereby the burning liquid mass was supposed to have cooled and solidified first near the poles, growing gradually temperate from the poles towards the equator. According to this notion, life and, it was natural to suppose, man himself originated in the northern latitudes. Bailly found confirmation of this theory in tradition which, he was sure, contained a kernel of historic truth.

> C'est à la dispersion des hommes qu'il faut rapporter la naissance des fables. Les hiéroglyphes mal entendus, les récits exagérés, et le goût naturel de l'homme pour le merveilleux en sont les sources naturelles. On peut rappeler à l'astronomie, comme a fait M. Court de Gébelin,[40] l'origine de plusieurs de ces fables.[41]

A correct astronomical interpretation of certain fables, according to Bailly, permits their orderly arrangement by latitude and in a relatively chronological order. The principal myths of astronomical significance are those of:

1. Proserpine, whose six months on earth and six months below the earth symbolize the disappearance of the sun in the polar regions for half the year.
2. Hercules and the Amazons, who represent the struggle of light and darkness at the vernal equinox.
3. The Phœnix (common to both Egypt and Scandinavia), whose three-hundred-day life, migration southward, immolation by fire and return northward represent a somewhat more southerly latitude (*circa* 79° N.), where the sun is absent for only sixty-five days in the year.
4. Janus, whose effigy, according to Macrobius, held the numbers three hundred in one hand and sixty-five in the other, and who originates in the same latitude as the Phœnix.
5. Osiris and Adonis, whose death and resurrection after forty days places this legend *circa* 68° N.

In the course of man's slow progress southward from the polar regions, Bailly believed that astronomy began to flourish between 60° and 50° N., where the sun was visible daily, where the whole of the zodiac was to be seen, and where the division of the year into four seasons was most pronounced. By the same hypothesis he sought to explain the degeneration of astronomical knowledge among peoples of more recent antiquity; the temperate climate was conducive to "cet heureux mélange de force et d'activité nécessaire au progrès des connaissances," whereas the hotter climate near the equator was enervating and brought about a diminution of intellectual activity.

It must be said that Bailly did not insist upon the whole fabric of antediluvian astronomy; it is only in the light of his later writings that one begins to question seriously the implications of the *Astronomie ancienne*. His thesis here is simply that the knowledge of the various ancient peoples seemed to exceed their means of acquiring that knowledge, and that the complementary aspects of their knowledge (and errors) strongly suggested a common source. He even hedges on the theory of north-to-south migration which he refers to as "cette marche purement hypothétique":

> Mais le temps manque à cette progression; le monde n'est pas assez vieux pour cette marche du genre humain qui, parti du pôle, toujours chassé par le refroidissement de la terre, irait attendre la destruction de l'espèce à l'équateur; tout ceci n'est qu'une fiction dont nous avons examiné astronomiquement les conséquences; il est temps de revenir à la vérité. Les faits de l'histoire indiquent une autre marche au genre humain. . . .[42]

Four of the nine chapters of the *Astronomie ancienne* are devoted to the general subject of antediluvian astronomy; the rest, to an examination of the recorded history of astronomy among the Persians, Chaldeans,

[35] *Ibid.*, 6.

[36] Bailly was not consistent in defending the historicity of these figures, as witness the remark (ASTR ANC, 5): "Ces personnages, ainsi que le plus grand nombre de ceux dont il est question dans la mythologie grecque, ne sont que des emblèmes."

[37] ASTR ANC, 6–7.

[38] *Ibid.*, 9.

[39] *Ibid.*, 95.

[40] The reference is to his *Allégories orientales* (1773), the first volume of the *Monde primitif*.

[41] ASTR ANC, 91.

[42] *Ibid.*, 105.

Egyptians, and Greeks. A scant twenty pages are given over to the Chinese and the Indians, who are praised for their instruments and the diligence of their observations, but dismissed as originators because of their profound lack of basic comprehension, "semblables à des étrangers qui ont retenu quelques phrases d'une langue qu'ils n'entendent pas." [43]

Bailly regarded the Chaldeans as "le plus savant des peuples de l'antiquité." [44] Their uninterrupted observations over a two thousand year period, their accurate knowledge of the motion of the moon and the effect of precession, their computation of the saros, their belief in the return of comets,[45] their determination of the synodic period of Jupiter, and their accurate chronology placed them, he felt, closest to the unidentified parent race. The Egyptians, on the other hand, owed most of their astronomical knowledge to Chaldea and India, and gradually lost most of what knowledge they had because astronomy fell into the hands of non-observing priests, who used it for cult, rather than civil, purposes. However, Bailly attributed to the Egyptians the discovery of the true movement of Mercury and Venus about the sun. "Ils ont manqué de génie et d'observations pour étendre cette belle idée au reste des planètes." [46]

The Greeks, too, were younger in astronomy than the Chaldeans, from whom they borrowed most of their early knowledge. The primary concern of their earliest years was the establishment of a reasonable calendar. They made no observations of their own for this purpose, but introduced corrections from abroad.

> . . . les Grecs 1000 ans avant Jésus-Christ ne connaissaient point ces phénomènes par la théorie de la sphère ni par le récit de quelque voyageur, témoin oculaire, mais . . . ils les connaissaient confusément, par une tradition vague, incertaine, étrangère même au pays où ils l'avaient puisée.[47]

The first real astronomer in Greece, according to Bailly, was Thales, founder of the Ionian sect. He and his followers introduced the gnomon, sphere, and zodiac into Greece, measured the sun and the moon, and correctly described the form of the earth, but Bailly insists that little of their work was original. "Nous devons répéter que l'astronomie de la Grèce consiste presqu'uniquement dans les opinions de ses philosophes. On n'y observa point, ou du moins la plupart des observations qui ont pu y être faites ont été ensevelies dans l'oubli." [48]

Bailly deals more favorably with Pythagoras, Plato, and Eudoxus—"le plus grand astronome avant Hipparque." [49] Pythagoras, disciple of Thales and a traveler to Phœnicia, Chaldea, India, and Egypt, who returned to teach first at Samos and then at Cortona, taught the sphericity of the earth, the rotation of the moon and the return of comets. Although he taught publicly that the earth was the center of the universe, privately he taught that it moved around the sun.[50] Plato, although not an astronomer himself, united the findings of the Pythagoreans, the Ionians, and the Eleatics and proposed the true goal of astronomy: to know "le mouvement des huit spheres," [51] "comment les sept sphères roulent sous la première et selon quel ordre chacune d'elles achève sa révolution." [52] Plato knew that astronomy must be founded in science and mathematics, and it was his friend and disciple, Eudoxus of Cnidus, who undertook to explain the causes of planetary motion by the invention of a series of concentric spheres. The explanation was absurd, but Bailly was inclined to view it as a measure of progress.

Even Eudoxus, however, was no observer, and Bailly repeats his criticism of Greek astronomy, based as it was on dialectics rather than observation.

> Non encore convaincu de la nécessité des faits qui sont les seules connaissances, [l'esprit grec] croit qu'on peut en raisonnant, en conjecturant, approfondir la nature sans l'observer; et quelquefois le hasard, ou le génie, fait sortir du choc des opinions des étincelles qui éclairent cette nuit profonde.[53]

Bailly's repeated criticism of the speculative aspect of Greek astronomy strikes one as something of a compensatory gesture. Having indulged in some rather wild speculation of his own, he hastens to reaffirm his faith in facts "qui sont les seules connaissances." Indeed, the whole of the *Astronomie ancienne* resembles a debate in which Bailly upholds first one side and then the other. The concluding argument in this debate is a discourse on judicial astrology, in which Bailly sees "le louable motif de la recherche des vérités" warped and pervaded by materialism. He believes that astrology is not natural to primitive and unenlightened peoples, but

[43] *Ibid.*, 107.
[44] *Ibid.*, 152.
[45] Of their knowledge of comets Bailly wrote: "Si cette opinion n'est pas, comme nous l'avons pensé, un reste d'une astronomie plus ancienne, il faut croire que le hasard les a bien servis." (ASTR ANC, 148.)
[46] ASTR ANC, 171.
[47] *Ibid.*, 192.
[48] *Ibid.*, 202.
[49] *Ibid.*, 243.
[50] It is curious that, despite his penchant for correspondences, Bailly was unimpressed by Pythagoras' music of the spheres: "Ce philosophe est justement célèbre par l'invention de la théorie de la musique. Il donna naissance à une nouvelle branche des mathématiques, en établissant les proportions pour la source et le fondement des accords. Frappé de cette découverte, et entraîné par la manie philosophique des Grecs, qui voulaient toujours généraliser, il pensa qu'il devait retrouver cette harmonie dans le ciel, et que le mouvement des astres et des sphères devait rendre un son, qui étant proportionnel à leurs distances mutuelles formait un concert céleste. . . . Il n'est pas nécessaire de dire que ces rapports des distances des planètes sont faux. On ignore si Pythagore avait été conduit à cette idée par les distances mal connues des planètes, ou si, prévenu de l'harmonie chimérique des astres, il avait déduit la proportion de leurs distances des intervalles qui sont entre certains accords." (ASTR ANC, 214–215.)
[51] ASTR ANC, 233.
[52] *Ibid.*, 236.
[53] *Ibid.*, 257.

is the conscious work of misguided philosophers. In this connection, he comes remarkably close to damning the materialism of his own century.

Nous pensons que l'astrologie judiciaire a eu sa source dans le matérialisme. . . . Quelle différence y a-t-il entre l'homme de Spinosa et l'homme dont un astrologue va tracer la destinée? Le spinosiste vous dira que toutes nos déterminations sont écrites d'avance dans le grand livre du monde, dans ce livre où pourrait lire celui qui aurait embrassé la nature entière et découvert toutes ses lois. Un astrologue va plus loin; il se vante de connaître ces lois. Un astrologue de bonne foi serait nécessairement athée comme Spinosa.[54]

Bailly feels that Leibnitz' system of monads falls into the same error of determinism, but "Leibnitz était trop bon philosophe pour ne pas sentir l'impossibilité de résoudre un pareil problème." [55] It is curious that Bailly, who, in many respects, stands at the highest point of eighteenth-century materialism, should denounce that same materialism in a way that anticipates Chateaubriand, Joseph de Maistre, and other writers of the Catholic revival.

The *Histoire de l'astronomie ancienne* probably reached the public in October or November of 1775, for it is mentioned in Grimm's correspondence for November as having appeared "depuis peu de jours."[56] It was immediately seized upon by Meister as an important contribution to the philosophic literature of the day: "l'*Histoire de l'astronomie ancienne* par M. Bailly pourrait bien nous conduire quelque jour aux découvertes les plus importantes sur l'origine de nos actes et de nos connaissances." [57] Even the speculative portions of the book were praised: "si son système n'est pas démontré, il est fondé du moins sur une suite d'observations si heureusement rapprochées qu'il nous paraît impossible de ne pas le trouver infiniment probable." [58] Grimm's enthusiasm for the work either led him to send, or persuaded Bailly to send, a copy of the history to the Empress of Russia; Mérard de Saint-Just reports that Catherine sent Bailly in return "une boite d'or émaillée et garnie de diamants." [59] This generosity conceivably owed less to Catherine's interest in astronomy than to Bailly's suggestion [60] that the cradle of civilization might be found in the neighborhood of Selinginskoe, in Siberia, where archeological discoveries had seemed to confirm his suspicions of a northern parent race.

Bailly also hastened to send a copy of his work to the patriarch of Ferney, who acknowledged it in a letter of December 15, 1775, which reads in part:

J'ai bien des grâces à vous rendre, Monsieur; car ayant reçu le même jour un gros livre de médecine et le vôtre, lorsque j'étais encore malade, je n'ai point ouvert le premier, j'ai déjà lu le second presque tout entier, et je me porte mieux. . . . Je vois dans votre livre, Monsieur, une profonde connaissance de tous les faits avérés et de tous les faits probables. Lorsque je l'aurai fini, je n'aurai d'autre empressement que celui de le relire; mes yeux de quatre-vingt-deux ans me permettront ce plaisir. Je suis déjà entièrement de votre avis sur ce que vous dites qu'il n'est pas possible que différents peuples se soient accordés dans les mêmes méthodes, les mêmes connaissances, les mêmes fables et les mêmes superstitions, si tout cela n'a pas été puisé chez une nation primitive qui a enseigné et égaré le reste de la terre. Or, il y a longtemps que j'ai regardé l'ancienne dynastie des Brahmanes comme cette nation primitive. . . .[61]

Voltaire turns Bailly's own sources against him in defense of the Indians, but the letter is sympathetic in tone. The matter might very well have rested there if Voltaire had not written a second letter (January 19, 1776) in which he more specifically attacked the Tartars and the Scythians.

Il ne nous est jamais venu de la Scythie européenne et asiatique que des tigres qui ont mangé nos agneaux. Quelques-uns de ces tigres, à la vérité, ont été un peu astronomes, quand ils ont été de loisir, après avoir saccagé tout le nord de l'Inde. Mais est-il à croire que ces tigres partirent d'abord de leurs tanières avec des quarts de cercle et des astrolabes?[62]

Bailly came to the rescue of his Scythians in a reply of January 29,[63] which elicited a third and more lengthy letter from Voltaire. Voltaire expressed his doubts that the Indians had really fallen into such great ignorance as had been reported by eighteenth-century travelers, but denied in any case that this would disprove their original superiority. His arguments are not satisfactory, as they are more witty than factual[64] and, as is not infrequent with Voltaire, self-contradictory.[65] This letter shows a certain impatience with Bailly's tenacity.

[54] *Ibid.*, 268.
[55] *Ibid.*, 271.
[56] *Op. cit.* **11**: 153.
[57] *Ibid.*, 167.
[58] *Ibid.*, 153.
[59] *Op. cit.*, 55–56.
[60] ASTR ANC, 95–96.
[61] ORIG SCI, 1–3; Voltaire **49**: 453.
[62] ORIG SCI, 6–7; Voltaire **49**: 488.
[63] This letter does not appear in the works of either writer. Moland mentions it as appearing in an autograph catalogue where it is described as a "belle lettre où il expose cette idée, commune à Voltaire et à lui [*sic*], que les Indiens sont les plus anciens peuples dont la mémoire nous soit parvenue." (Voltaire **49**: 500, note.)
[64] For example: "L'idée que notre pauvre globe avait été autrefois plus chaud qu'il n'est, et qu'il s'était refroidi par degrés, me faisait peu d'impression. Je n'ai jamais lu le *Feu central* de M. de Mairan; et depuis qu'on ne croit plus au Tartare et au Phlégéton, il me semblait que le feu central n'avait pas grand crédit." (Voltaire **49**: 511.)
[65] Voltaire argued that the absence of genius in contemporary India was no proof that it had not once existed. The same could be said for Bailly's northern people: "Les tigres du nord, qui ont dévasté le midi de l'Asie, n'avaient sans doute ni quart de cercle ni astrolabe; mais observez, je vous supplie, Monsieur, que quand je dis que les peuples de Tartarie ont été éclairés, j'ai en vue ceux qui existaient trois à quatre mille ans avant les barbares dont vous parlez. Nous pourrions également conclure que la Grèce n'a eu ni Sophocle ni Démosthène, parce que les Turcs qui la possèdent sont féroces, ignorants et qu'ils dévasteraient l'Europe si on les laissait faire." (ORIG SCI, 257–258.)

Vous faites, Monsieur, comme les missionnaires qui vont convertir les gens dans le pays dont nous parlons. Dès qu'un pauvre Indien est convenu de la création *ex nihilo*, ils le mènent à toutes les vérités sublimes dont il est stupéfait. Vous n'êtes pas content de m'avoir appris des vérités longtemps cachées; vous voulez toujours que je croie à votre ancien peuple perdu. . . .[66]

There may be some justification for Nourrisson's remark that "Bailly ne comprit rien à cette politesse ironique d'un vieillard qui désirait être enfin délivré d'une controverse insipide."[67] Yet Nourrisson seems to ignore that Voltaire took the initiative in the correspondence and even wrote at some length on this "insipid" subject. Bailly was certainly not incapable of understanding Voltaire's irony. The two volumes that evolved out of this discussion would suggest rather that he was astute enough to recognize a first-class opportunity to acquire publicity. Voltaire's arguments were not strong; Bailly's theory had yet to be disproved; the Buffon theory of the earth's origins and the mysteries locked in the chronicles of the Orient were the subject of lively public interest. There was nothing to be lost and much to be gained by turning this private correspondence into a public debate. In a series of ten letters written between August 10 and September 24, 1776, Bailly elaborated the argument first propounded in the history of ancient astronomy. It is doubtful whether these letters were ever sent to Voltaire in their original form, as there is no mention of them in his correspondence. They appeared in book form under the title of *Lettres sur l'origine des sciences, et sur celle des peuples de l'Asie* early in 1777.[68]

Bailly accepted the "missionary" epithet: "Je puis bien avoir quelque chose du zèle des missionnaires, et même de leur persévérance: *je désire toujours que vous croyiez à mon ancien peuple perdu.*"[69] Taking a broader view than Voltaire, he retraced a good portion of the argument of the *Astronomie ancienne*, examining in turn each of the peoples of antiquity as the possible source of civilization. From the Jesuit accounts of China published in the *Lettres édifiantes et curieuses*[70] he quarried passage after passage to back his view that the earliest period of that country's history was its most learned, that Fu-Hi, Huang-Ti, and Yao were founding fathers who had brought their people and their knowledge from another area where they had been long established, and that the Chinese of a more modern age simply followed in the well-beaten track of tradition, without real progress and without materially adding to their science. From the fragments of Berosus preserved by Eusebius[71] he cited the founding of Persepolis and of the Persian empire at a time deemed by astronomical observation to be the most auspicious, and saw in this proof of "une colonie sortie d'un pays trop peuplé, ou une nation déjà instruite et civilisée descendant vers un pays plus tempéré, plus fertile et s'y établissant avec ses arts et ses connaissances."[72] From the *Shaster*, from the accounts of missionaries in India, from Legentil and other travelers he extracted comments calculated to soothe Voltaire and still prove his own point. The philosophy of the Indians he called "souvent sage et sublime"[73] but he ridiculed their sciences. "Les Indiens competent cinq mille veines dans le corps humain, mais ils n'ont point d'anatomie, puisqu'ils ne se permettent pas la dissection."[74] The conclusion is the same as for the Chinese, Persians, and Chaldeans—that of a civilization in decline. But he mollified Voltaire's irritation to some extent:

C'est avec raison que les sages de la Grèce ont été puiser chez eux la vraie philosophie. Les Brames, dépositaires de cette ancienne philsophie, nous l'ont communiquée; ils ont fondé toutes nos connaissances. Ce sont nos maitres, et, pour tout dire en un mot, ils sont dignes de votre admiration et de vos éloges.[75]

Bailly introduced a new argument in connection with the Indians which carries greater weight today than it did in the eighteenth century; it is the factor of language. He recognized in Sanskrit a parallel with the classical languages of western civilization; he pointed out the continued use of Greek as the learned language of Rome and the continued use of Latin as the learned language of France.

. . . si un Indien venu à Paris voyait étudier et lire la langue latine, tout à fait différente du langage ordinaire, entièrement inconnue aux trois quarts de la nation, n'aurait-il pas droit d'en conclure que c'est la langue d'un peuple qui n'existe plus, et d'un peuple plus ancien que les Français? Pourquoi n'aurions-nous pas droit de tirer, à l'égard des Indiens, la même conclusion du Sanscrit? . . . On voit donc clairement que les Brames, sortis d'un pays où cette langue était en usage, où ces livres avaient été écrits, les ont apportés dans l'Inde. . . . Je vous ai réservé, Monsieur, pour la dernière, cette preuve qui ne s'est présentée à moi que depuis quelque temps; elle me semble de la plus grande force.[76]

This notion was most likely found in Court de Gébelin's *Histoire naturelle de la parole, ou précis de l'origine du langage et de la grammaire universelle*

[66] Voltaire **49**: 510. The first two letters from Voltaire are identical in ORIG SCI and the Moland edition. There is a disparity in the two texts of the third letter. The portion quoted above follows the Moland edition. Bailly has been careful to suppress several anticlerical passages in ORIG SCI, *viz:* "Si un Bernier indou était venu à Paris ou à Rome entendre un professeur de la Propagande ou du Collège des Cholets, et s'il jugeait de nous par ces deux animaux, ne nous prendrait-il pas tous pour des fous et des imbéciles?"

[67] *Op. cit.*, 345.

[68] Grimm's *Correspondance* for March 1777 refers to the book as newly published. Voltaire's letter of February 27 acknowledges receipt of the work. ORIG SCI was published in London and Paris without *privilège*.

[69] ORIG SCI, 15.

[70] Edited by Gobien, du Halde and others, Paris, 1702–1776.

[71] Eusebius of Cæsarea (260?–340?), *Chronicon*.

[72] ORIG SCI, 43–44.

[73] *Ibid.*, 51.

[74] *Ibid.*, 73.

[75] *Ibid.*, 89–90.

[76] *Ibid.*, 85–89.

(Paris, 1776) which was an abridgment of the second and third volumes of his *Monde primitif*. Without specifically denying the Scriptural tradition that Hebrew was the first language and of divine origin, he ruled it out by implication. Language was a natural gift, and its evolution therefore followed a natural law. On this theory Gébelin founded his comparative grammar and science of etymology. He postulated *langues-mères* which were initially only dialects of the one primitive language which was altered increasingly as it spread over the earth, and *langues-filles* which were second generation descendants. He instanced old Germanic in the first category and English, Danish, Swedish, etc. in the second. Gébelin recognized the existence of root-words and word families; he knew that simple household words evolve more rapidly than learned words, and words with concrete meanings more rapidly than words with abstract meanings; he acknowledged the force of analogy. In short, he conceived the pyramidal structure of language which was to be so widely accepted in the nineteenth century.[77] Bailly acknowledged his indebtedness to Gébelin's work on language in the *Lettres sur l'Atlantide*. Although he makes no textual reference to it in the *Lettres sur l'origine des sciences*, that would seem to be his most likely source, for he already knew and had used the first volume of the *Monde primitif* in his history of ancient astronomy.

Having proved to his own satisfaction that neither Persia, China, nor India could be regarded as the cradle of civilization, Bailly turned again to the evidence of their common origin. The habit of pouring libations to the Gods or to the dead, the tradition of a deluge or universal cataclysm, of a golden age and of a prehistoric migration, the cult of mountains and high places, and an all-but-forgotten fear of giants who lived behind them, he pointed out, were common to Chinese, Tartars, Greeks, Romans, Chaldeans, Indians, Hebrews. Among each of these peoples, the first or principal god, their founder, the object of their worship, and the source of their philosophy were one and the same figure. Finally, each of these peoples had a dual dogma in recognition of the "deux principes de la nature: la matière inerte, et la force ou l'esprit universel qui l'anime." [78]

Bailly repeats from the history of ancient astronomy much of the evidence concerning purely scientific knowledge: the zodiac, the sexagesimal system, common astronomical periods, etc. A new argument, merely referred to in these letters, but developed at length in a "Mémoire sur les mesures longues des Grecs et des Romains," [79] was that a number of ancient measures of the earth's circumference were really one and the same measure, rendered in different units.[80]

The fifth and sixth letters are devoted to the thesis that these conformities are not the result of direct communication between the nations of antiquity. Bailly depicts the physical difficulties of transportation over vast land routes and perilous sea journeys, the isolationist policies practiced especially by the Chinese. He points out that scientific knowledge was generally the property of priests and prophets and that, as a class, they were the most jealous of the mysteries of their cult. He adduces their ignorance of geography and of the most elemental facts about their closest neighbors.

> Il me paraît évident que les nations de l'Asie sont encore isolées. . Concentrées dans leurs frontières, comme les habitants d'une ville dans leurs murailles, elles n'ont fait la guerre que par des sorties et des excursions, le commerce, que chez leurs voisins, et avec peu d'activité.[81]

Even admitting that a certain number of common ideas are the result of intercourse between peoples, or that some ideas are natural to all men, Bailly still insists that "il en restera toujours pour démontrer ma conclusion. Ces conformités mêmes ne seraient point essentielles; elles ne sont qu'un surcroît de preuves. L'existence de ce peuple antérieur est prouvée par le tableau des nations de l'Asie." [82] The tableau to which he refers is based on a cyclical theory of civilization. A young nation is an expanding nation; ambition drives it into commerce, wars of conquest, colonization. As it matures, it turns its attention to useful and moral activities. "Le véritable bonheur et la fortune solide pour les peuples comme pour les hommes c'est de cultiver en paix son champ et d'y vivre vertueux et tranquille." [83] But this same virtue and attention to industry, arts and sciences bring about the loss of the colonies and of military hegemony, and the nation "revient au terme d'où elle était partie, épuisée par l'effort d'acquérir et de conserver, et ruinée par sa grandeur même." [84] The colonies, profiting from the impetus given them by the parent nation, break away and, themselves, follow through the same cycle.[85] It was Bailly's view that his

[77] I have used the second edition, *Histoire naturelle de la parole, ou grammaire universelle à l'usage des jeunes gens*, Paris, Plancher, Eymery, and Delauney, 1816. The text is the same as that of the 1776 edition. Notes have been added by Lanjuinais.

[78] ORIG SCI, 132. All these points are developed at length in the third letter to Voltaire.

[79] Bailly says that this *mémoire* was "lu à la séance publique de l'Académie des Sciences le 17 avril de cette année" (1776); but it is not published in MEM AC SCI for 1776, and there is no mention of such a paper in Demours, *Table générale*. See *infra*, p. 470.

[80] ORIG SCI, 148–149.

[81] *Ibid.*, 181.

[82] *Ibid.*, 203.

[83] *Ibid.*, 189. The echo of Voltaire's own writings is frequent in these letters and is no doubt intentional.

[84] *Ibid.*, note (*a*). China is cited as the best example of this cycle.

[85] "L'Amérique offrira un jour le tableau que nous venons de tracer. Les naturels secoueront le joug, les colonies se sépareront; il se formera des peuples nouveaux et des états indépendants. Cependant quelques-unes de nos institutions y subsisteront; des usages portés de l'Europe y seront communs à différents peuples; des connaissances de physique et d'astro-

ancient people represented civilization in the expanding and vigorous stage, that the founding of Chinese, Indian, Persian, and Egyptian civilizations represented the era of conquest and colonization, and that these nations in modern times represented the wreckage of their former grandeur. Attributing to the Atlanteans the best qualities and the most accurate knowledge of the various peoples of antiquity, Bailly endeavors to prove in his seventh letter that this ancient people possessed "le vrai système de l'univers" [86] and "une philosophie sage et sublime." [87]

The last three letters are a résumé of evidence in favor of placing the origin of man—or of civilization—in north central Asia. The most interesting arguments are those gleaned from Court de Gébelin's comparative grammar and Linnæus' botany. Bailly repeats Gébelin's observations on the relation of common roots in European and Asiatic languages and his deduction of a common source.[88] From Linnæus we learn that a number of common vegetables (among them spinach and hops) and more especially grains (wheat, barley, and rye) grow wild in Siberia and were, presumably, introduced from there into Europe. "Cet habile botaniste conclut que la Sibérie peut être le pays d'où les hommes sont sortis après le déluge, pour se disperser dans le reste du monde, puisque cette contrée est celle qui a produit les premiers aliments des hommes civilisés." [89] Much of Bailly's sound erudition is vitiated by surmise, as for instance the statement that large niter and saltpeter deposits in Siberia automatically prove the former existence there of a dense population.[90] It is none the less true, however, that Bailly assembled an impressive array of "facts," which, if not proven, were at least discouragingly difficult to disprove.

The ninth letter is a bit of gratuitous proselytism. Voltaire had made the mistake of saying that he had never read Mairan's work on *le feu central*,[91] which is most unlikely, considering the very close contacts between them during Voltaire's "Newtonian period" at Cirey [92] and the extent of their correspondence between 1724 and 1765.[93] Be that as it may, Bailly undertook to describe "ce beau système, ou plutôt cette grande vérité," [94] as an adjunct to Buffon's theory of the origin of the earth, which constitutes the substance of the tenth and last letter. If the law of nature as envisaged by Buffon be accepted—the continual and universal process of growth and decay, of creation and destruction—and if his explanation of the earth's beginning as a fiery mass be accepted as well, the cooling of the earth's surface becomes merely a natural consequence. "Ma bougie s'use en m'éclairant; le feu de ma cheminée s'éteint, s'il n'est pas entretenu; et comme on ne me dit pas que le feu intérieur de la terre se renouvelle, j'en conclus qu'il sera détruit un jour." [95] Paleontology seemed to offer confirmation of the Buffon theory, and Bailly instanced Leibnitz' discovery of tropical plants in stones found in Germany [96] and the remains of elephants (or mammoths) found in northern Ireland, Canada and Siberia.[97] It is curious how nearly right Bailly was in many respects: he discarded the miraculous explanations of these phenomena [98] in favor of the simplest explanation, which was change of temperature. Bailly would have done well to let his case rest with the weight of his arguments; it was perhaps indelicate of him to hold Buffon up to Voltaire as the very model of scientific rationalism: "Il vaut bien mieux nous ranger auprès de M. Buffon." [99]

One may wonder how Bailly could have gone off on such a tangent as his *Lettres sur l'origine des sciences* represent. The explanation is relatively simple, and Bailly had offered it himself some years earlier as an apology for Leibnitz' metaphysics:

> Comment . . . a-t-il pu se livrer à ces méditations infructueuses? Comment la philosophie ne l'a-t-elle pas arrêté? C'est que la philosophie a ses degrés et ses âges; c'est qu'elle est d'abord incertaine dans sa marche; le désir de tout découvrir l'écarte de la vraie route; et quand l'ima-

nomie s'y conserveront. Ces connaissances, trop avancées pour des nations naissantes, ou pour celles qui seront indolentes et sans génie, étonneront celui qui les pèsera dans la balance de la philosophie. Pourrait-on avoir tort de conclure alors que ces institutions, ces usages appartiennent à un peuple antérieur? L'Europe sera peut-être aussi inconnue dans l'avenir que le peuple dont je vous entretiens aujourd'hui." (ORIG SCI, 198–199.)

[86] ORIG SCI, 212.

[87] *Ibid.*, 205.

[88] *Ibid.*, 232.

[89] *Ibid.*, 237–238. The reference is to a passage from Linnæus quoted in August Ludwig von Schloezer, *Probe russischer Annalen*, 45–46, Bremen and Göttingen, 1768.

[90] *Ibid.*, 240–241.

[91] Jean-Jacques Dortous de Mairan (1678–1771), Secrétaire Perpétuel of the Academy of Sciences following Fontenelle, had demonstrated that temperature rises towards the center of the earth. He was the first to measure with any degree of accuracy the earth's own heat which he showed to be independent of that received from the sun. His works include numerous *mémoires* in MEM AC SCI (especially 1764 and 1765), a *Dissertation sur la glace*, 1715, and a *Mémoire sur la cause du froid et du chaud*, 1741.

[92] Voltaire wrote his *Essai sur la nature du feu et sur sa propagation* for the competition at the Academy of Sciences in 1738. Mme du Châtelet competed for the same prize, arguing in her monograph in favor of the *feu central*. (See Voltaire **22**: 279 ff.) It was at this period that Voltaire wrote to Mairan: "Nous vous étudions. . . . Les matières que nous traitons ici ne font que redoubler notre estime pour vous." (Voltaire **35**: 114). In 1741, Mairan addressed one of his books to Mme du Châtelet—*Lettre à Mme *** sur la question des forces vives.*

[93] Mairan was one of Voltaire's earliest correspondents, and the exchange of letters continued until Mairan's death. Voltaire wrote on February 1, 1734, "Vos livres sont comme vous, sages, instructifs et agréables." (Voltaire **33**: 407.) On December 3, 1749, he said specifically, "J'ai lu votre *Glace*." (Voltaire **37**: 85.)

[94] ORIG SCI, 269.

[95] *Ibid.*, 310.

[96] *Ibid.*, 314–320.

[97] *Ibid.*, 320–327.

[98] *Ibid.*, 324–326.

[99] *Ibid.*, 326.

gination lui offre ses systèmes, elle en fait l'essai comme d'un instrument propre à chercher la vérité.[100]

Bailly was fired with the desire to know everything; repeatedly we find him searching for the simple answer, the formula, the mysterious key—in the identification of the Janus and Phœnix legends; in the identification of Buddha, Thoth, Mercury, and Zoroaster; in the reconciliation of astronomical periods, linear measure, language, customs, and legends.[101] Much of the information on which he based his system was wholly or partially inaccurate; he accepted blindly the Chinese estimate of their own antiquity, which has been proved to be greatly exaggerated;[102] he generalized particular facts without justification, such as the seven-day week of the ancients;[103] and he drew erroneous conclusions from real facts which, in more modern times, have received more satisfactory explanations—e.g. the change in temperature in northern latitudes, the earth's inherent heat, etc. The entire fabric of his argument gave way as its respective parts came under close scrutiny. The modern view of Bailly's theory is well summed up in Bigourdan's *L'Astronomie, évolution des idées et des méthodes:*

> L'hypothèse de Bailly est insoutenable, et tout concourt à montrer que, pour l'astronomie comme pour bien d'autres sciences, l'étude en a été surtout imposée à l'origine par des besoins d'ordre pratique, par le désir de satisfaire les nécessités ou les commodités de la vie. Dès les premiers âges de la pré-histoire, en effet, l'homme a été forcé de porter son attention sur les phénomènes célestes qui règlent le renouvellement périodique de ses besoins, l'ordre de ses occupations, la succession des saisons; la nécessité de diviser le temps imposait à l'homme l'étude du ciel; et c'est pour cela qu'on trouve les premières notions d'astronomie chez tous les peuples.[104]

Yet judged against its contemporary background, Bailly's book was a work of considerable erudition and a provocative synthesis of newly discovered data. Joseph de Guignes[105] had opened the debate with his *Mémoire dans lequel on prouve que les Chinois sont une colonie égyptienne* (Paris, 1759). His thesis had been refuted by Cornelius de Pauw[106] in the *Recherches philosophiques sur les Egyptiens et les Chinois* (2 v., Berlin, Decker, 1773), a work which won the applause of the *philosophes* and the ire of the Jesuits because of the disparaging way in which de Pauw dealt with the *Lettres édifiantes*. A world which was reading Court de Gébelin, de Guignes and de Pauw could not but be intrigued by Bailly's contribution. Meister found in it "un excellent esprit, des connaissances rarement réunies, et la logique du monde la plus séduisante et la plus ingénieuse."[107] To be sure, d'Alembert and Condorcet ridiculed Bailly cruelly, but this may well have been inevitable after the political encounter in the Academy of Sciences.

One of the effects of the publication of Bailly's *Lettres sur l'origine des sciences* was a polemic by the abbé Baudeau entitled *Mémoire à consulter pour les anciens Druides: contre M. Bailly* (Paris, 1777). Baudeau disparaged the races of Asia and tried to make a case for the antiquity of culture among the peoples of Europe. He proposed that:

> Bailly soit condamné à composer et à publier incessament un troisième ouvrage, dont il aura soin de lire les essais dans les assemblées publiques de l'Académie des Sciences, lequel ouvrage sera aussi savant, aussi curieux, aussi bien écrit que les deux premiers . . . ; et qu'en icelui soit contenue la réparation d'honneur la plus authentique aux peuples gaulois, celto-scythes, hyperboréens, illyriens ou phrygiens d'Europe et à leurs druides. . . .[108]

Mérard de Saint-Just suggests Baudeau was not to be taken seriously, or at least that Bailly did not take him seriously. "Bailly ne répondit au moine défroqué de la Chancelade que . . . par le silence du mépris."[109] This is not quite the case however. Bailly took note of the argument for the Druids in the *Astronomie moderne* (1: 294–298) and in the *Lettres sur l'Atlantide* (326–332), where we read:

> [Les Gaulois] m'ont intenté un procès, à moi, Monsieur, qui entends peu les affaires et surtout la chicane. Leurs Druides ont choisi un excellent avocat, tel que je l'aurais choisi moi-même, si j'avais eu une cause à défendre. Il a plaidé avec chaleur pour eux, avec politesse pour moi; j'eusse été séduit si je pouvais l'être. . . . Cependant, Monsieur, tout le monde peut avoir raison. . . . Je conçois . . . que nos bons Gaulois sont descendus comme les autres peuples de la patrie commune. Les Druides leur chantaient des vers semblables à ceux qu'Orphée chanta jadis dans la Grèce; ils furent instruits, comme les Grecs, par ces traditions antiques. Mais j'avoue encore que les uns n'ont pas été si favorisés que les autres.

[100] DISC MEM 1: 231.

[101] It is the more remarkable that Bailly should have rejected the Pythagorean music of the spheres which in its musical and mathematical aspects is sound. (See Percy A. Scholes, *The Oxford companion to music,* London, etc., Oxford Univ. Press, 1938, under "Scales.")

[102] By Chinese reckoning Fu-Hi should have lived *circa* 2852 B.C., but modern historians place the founding of the Chou (first) dynasty *circa* 1122 B.C.

[103] "Rien n'est moins exact, cependant; on ne la trouve que chez les Juifs, d'où elle passa chez les Alexandrins. Au contraire, presque tous les anciens peuples, Egyptiens, Grecs, Chinois . . . comptèrent par périodes de dix jours ou décades." (Bigourdan, 60.)

[104] *Op. cit.,* 1–2.

[105] Joseph de Guignes (1721–1800), famous orientalist. Bailly had read his *Histoire générale des Huns, des Turcs, des Mogols et des autres Tartares occidentales,* 5 v., Paris, 1756, and his revised edition of *Le Chou-King, traduit par le P. Gaubil,* Paris, 1770.

[106] Cornelius de Pauw (1739–1799), German prebendary, sometime ambassador from the Bishop of Liège to Frederick the Great, and collaborator with Diderot and d'Alembert on the supplement of the *Encyclopédie,* had stirred up considerable discussion with his *Recherches philosophiques sur les Américains,* 2 v., Berlin, Decker, 1768–1769. Bailly consulted both de Guignes and de Pauw on the relations of ancient Egypt and China.

[107] Grimm, *Correspondance* 11: 432 (March, 1777).

[108] Quoted in Grimm 11: 508 (August 1777).

[109] *Op. cit.,* 53.

Although he was never converted to Baudeau's views, Bailly paid increasing attention to the prehistory of northern European nations, so that it cannot be said that this criticism was entirely without effect.

Voltaire must have received his copy of the *Lettres sur l'origine des sciences* straight off the press, for he acknowledged it in a letter of February 27, 1777. It is difficult to say whether he had bothered to read it before he replied, as his letter simply restates his doubts. "Je conçois qu'il est possible qu'un ancien peuple ait instruit les Indiens. Mais n'est-il pas permis d'en douter, quand on n'a nulle nouvelle de cet ancien peuple?" [110] That he was beginning to weary of the discussion is suggested by the quotation at the beginning of his letter: "Tradidit mundum disputationi eorum" [111] and his flippant comment on the Mairan theory:

> Je vous avoue que je n'avais lu le système de M. de Mairan. . . . J'étais seulement très persuadé qu'il y a partout du feu.
> Ignis ubique latet, naturam amplectitur omnem.[112] Les artichauts et les asperges que nous avons mangés cette année au mois de janvier, au milieu des glaces et des neiges, et qui ont été produits sans qu'un seul rayon du soleil s'en soit mêlé, et sans aucun feu artificiel, me prouvaient assez que la terre possède une chaleur intrinsèque très forte. Ce que vous en dites dans votre neuvième lettre m'a beaucoup plus instruit que mon potager.[113]

It was a year before Bailly had anything further to say on the matter,[114] and Voltaire had died before he had to acknowledge the next book. The day after his letter to Bailly, Voltaire wrote in a jocular tone to Condorcet: "On nous avait flatté que l'illustre secrétaire nous avertirait incessament du jour et de l'heure où notre globe de verre s'en irait en fumée, et quand la comète qui produisit autrefois la terre reviendrait la détruire," [115] to which Condorcet replied: "J'ignore absolument si la terre sera gelée, ou si elle sera réduite en poussière par le choc d'une comète, si elle sera brûlée par une explosion du feu central, ou si elle retournera dans le sein du soleil. Il n'y a que M. le Comte de Buffon et frère illuminé Bailly qui sachent toutes ces belles choses." [116]

The same opinion is expressed by d'Alembert:

> . . . je ris . . . d'un gros volume de lettres qui viennent de vous être addressées, et où l'on nous donne le feu central et le refroidissement de la terre comme des idées comparables au système de la gravitation. Supplément de génie que toutes ces pauvretés; vains et ridicules efforts de quelques charlatans, qui, ne pouvant ajouter à la masse des connaissances une seule idée lumineuse et vraie, croient l'enrichir de leurs idées creuses et nous persuader de l'existence d'un peuple qui nous a tout appris, excepté son histoire et son nom. Adieu, mon cher maitre. En lisant tout ce qui s'imprime aujourd'hui (qu'heureusement pour moi je ne lis guère) je pourrais dire, comme Pourceaugnac "Jamais je n'ai été soûl de sottises." [117]

The cult for perfect cycles, the scientific interpretation of myth, the identification of historical and legendary leaders, law-givers, philosophers and gods, and the conviction of the former existence on earth of a civilization with perfected skills and a "sublime philosophy" make Bailly the astronomer akin to Gébelin the historian. Both are prophets of the return of the golden age or the appearance of a new one to rival the old. "La résistance qu'on peut faire à l'opinion d'un ancien état des sciences perfectionnées, naîtrait-elle d'un sentiment de jalousie?" [118] But Court de Gébelin was not the only writer whose works parallel those of Bailly.[119] Lalande and Dupuis also were working towards a scientific explanation of myth and fable and towards a reconciliation of divers orders of knowledge, parts of what Dupuis called "une force unique, la souveraine puissance." [120] If, unlike many of the illuminati, Bailly did not associate the natural philosophy of the ancients with divine revelation, he did not preclude that possibility. "Quand on est privé des lumières de la révélation, peut-on parvenir à une idée plus grande et plus vraie de l'Etre suprême que celle de cette philosophie?" [121] But like many of his contemporaries he chose to keep religion and ra-

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[110] ATLAN, 6. This letter also appears with slight variants in Voltaire **50**: 194 ff.

[111] Ecclesiastes **3**: 11. Voltaire's meaning is not entirely clear. Although this phrase has commonly been applied to the eternal disputes of the learned, it is not certain that it should be taken here in the pejorative sense. The phrase is rendered variously in different versions of the Bible and must, in any case, be read in context. The "King James" text gives: "He (i.e. God) hath made everything beautiful in its time; also *He hath set the world in their heart,* yet so that man cannot find out the work that God hath done from the beginning even to the end." Moulton, *The modern reader's Bible,* 1537, calls "the work that God hath done" a formula, not for the phenomena, but for the underlying principles which are hidden and, Ecclesiastes thinks, impossible to discover. Bacon, *Advancement of learning* **1**: 3, quoted by Moulton, 1641, puts a rather different construction on the passage: "Although he doth insinuate that the supreme or summary law of nature . . . is not possible to be found out by man; yet that doth not derogate from the capacity of the mind. . . . " Voltaire would seem to agree with Ecclesiastes that first principles are not discoverable, but was he derogating from the capacity of Bailly's mind?

[112] This line is part of the device used to identify Voltaire's *Essai sur la nature du feu* in the Academy's competition of 1738. It is of his own composition. See Voltaire's letter to d'Alembert, July 1, 1766, and Moland's notes to the *Essai,* Voltaire **22**: 279.

[113] ATLAN, 7–8.

[114] Nourrisson, 345, implies that ATLAN followed ORIG SCI without a break; as a matter of fact there was a gap of sixteen months between the composition of the two books.

[115] Voltaire **50**: 197.

[116] *Ibid.,* 199.

[117] *Ibid.,* 201.

[118] ORIG SCI, 206–207.

[119] The first three volumes of the *Monde primitif* antedate Bailly's interest in antiquity; the last five appeared during the same years that he was writing the history of astronomy and the two volumes of letters to Voltaire.

[120] "Mémoires sur l'origine des constellations et sur l'explication de la fable" in Lalande, *Astronomie* **4**: 547.

[121] ORIG SCI, 208.

tionalism separate. "Je ne vous cite point l'Ecriture, parce qu'elle ordonne de croire et qu'il s'agit ici de démontrer ou du moins de persuader." [122] It is clear, then, that Bailly was ready for the extra-religious doctrine of Freemasonry.

Lalande was the master and Gébelin, the secretary of a remarkable lodge called Les Neuf Sœurs, founded by the *philosophes* and dedicated to the *grand ordre*. Jean-Sylvain Bailly was probably a member of this lodge. Although his name does not appear on the extant membership lists, Barruel [123] includes him among twenty-eight others who similarly do not appear on the official lists. Amiable [124] has shown six of these to be certain memberships (one of them, Pastoret, was master of the lodge), and the rest he calls "probable." Bailly falls into this latter category. It is likely that Bailly became a member after 1784, in the period for which official records are lacking, but his affiliation may have begun earlier in view of the large number of personal friends, correspondents, colleagues in the Academy of Sciences (as well as later colleagues in the French Academy and in the revolutionary government) who were members almost from the inception of the lodge. These include Cubières, Lalande, Court de Gébelin, Franklin, Voltaire, Condorcet, Roucher, and Guillotin.[125] Others, whose names were later associated with Bailly's, were Desmoulins, Chénier, Pétion, and Sieyès.

The quest for cosmic homogeneity began with the "chevalier" Ramsay [126] and the establishment of the first Scottish lodges in France. Although Ramsay claimed to be a Newtonian and these lodges were affiliated with the English Blue Lodge, Ramsay was responsible for the Orient cult which ultimately (1773) became the national or grand lodge of France. The grand mastery of the duc d'Antin (1738–1743) marked the beginning of a schism which was to last until the Revolution and make Freemasonry itself the battleground between the forces of reason and the forces of mysticism.[127]

The Blue Lodge tradition is one of simplicity and democracy. Initially the lodges were the common meeting ground of *philosophes,* bourgeois, churchmen, and noblemen. They were the only place where intelligent men, regardless of rank, trade or religion, could meet on equal footing. The catalyst was England's rationalistic, scientific, and commercial civilization, and everywhere during the eighteenth century English masons were active in spreading the doctrine of peace, brotherhood and progress. This was undoubtedly the aspect of Masonry which appealed to Montesquieu, Voltaire, Franklin, Helvétius, and Condorcet.

However, Freemasonry also had a strong appeal for the nobility, perhaps because initially it represented the cause of the Scottish émigrés, perhaps merely because of its novelty. Inevitably the Noailles, the Polignacs, the Rohans and the Bouillons found that their lodges were a bit too democratic. Above the only two degrees then recognized by English blue masonry, there gradually arose a superstructure of higher degrees accompanied by complicated ritual and symbolism. These accretions were supposedly authorized by the sudden "discovery" that Masonry had existed, not only since the medieval guilds, but from the days of Solomon. With the resurrection of Zorobabel came a flood of Knights of the Orient, Knights Templars, Mystic Masters, Royal Arch Masons, Perfect Masons, Small Architects, Grand Architects, Knights of the Spade and Rose-Croix, Noachites, etc. which seemed tailor-made dignities for dukes, marquesses, and counts.

Perhaps because at the critical moment Fleury was too old and Louis XV was too young to be interested, French Masonry, unlike its English sister, did not pass directly into the hands of the royal family. There is some question as to whether a lodge supposedly called the *Militaire des trois frères* was established for Louis XVI and his brothers. In any case, royal apathy or lack of interest may have been seconded by the Papal bulls of 1731 and 1751 which denounced the masonic order. These bulls were never registered by the pro-Jansenist *parlement,* and the French were therefore technically ignorant of the law.

Freemasonry in France in the middle of the century included an active group of "orthodox" lodges teaching Newtonian philosophy, an equally active group of aristocratic and ritualistic lodges under the patronage of the great noble families, a neutral royal family, and a clergy which, in the absence of orders "through channels," was free to behave as it pleased. The confirmation of the Grand Orient in 1773 as the grand lodge of France was a limited victory for the *illuminés* and the aristocrats, but a victory that was gradually ex-

[122] *Ibid.,* 105.

[123] *Mémoires pour servir à l'histoire du Jacobinisme,* 1797.

[124] *Une Loge maçonnique d'avant 1789.*

[125] Cubières joined the Neuf Sœurs 1776; knew Bailly from 1763.
Lalande joined the Neuf Sœurs 1776; knew Bailly from 1763.
Gébelin joined the Neuf Sœurs 1779; knew Bailly from 1775 (?).
Franklin joined the Neuf Sœurs 1778; knew Bailly from 1777.
Voltaire joined the Neuf Sœurs 1778; knew Bailly from 1775.
Condorcet joined the Neuf Sœurs (?); knew Bailly from 1769.
Roucher joined the Neuf Sœurs 1779; knew Bailly from 1780.
Guillotin joined the Neuf Sœurs 1779; knew Bailly from 1784 (?).

[126] Andrew Michael Ramsay (1686–1743), friend of Fénelon and Boulainvilliers.

[127] Faÿ, *Revolution and Freemasonry;* Lantoine, *Histoire de la Franc-Maçonnerie française* 1; Martin, *La Franc-Maçonnerie et la préparation de la Révolution.*

ploited during the next twenty years, as all but a handful of French lodges were absorbed by it. This date also marks something of a victory for the Orléans family, for Philippe d'Orléans, then duc de Chartres, later duc d'Orléans, still later Philippe Egalité, became Grand Master of all France, and a year later his sister, the duchesse de Bourbon, became Grande Maitresse of the Loge d'Adoption. Both Philippe and his sister Bathilde were adepts of illuminism, and their circle included Mesmer, Puységur, Bergasse, Madeleine Schweitzer, and Saint-Martin. The importance of their masonic connections to the political ambitions of the Orléans family cannot be overlooked.

Meanwhile, the *philosophes* were not prepared to lose their share in such a useful organization. Helvétius, who as a mathematician, disciple of Condillac, patron of the *Encyclopédie,* and author of *De l'Esprit* could hardly have been in accord with the hierarchical tendencies of French Masonry, is said to have proposed to Lalande sometime after 1767 the formation of a lodge catering to savants, men of letters, artists, and generally to all persons distinguished by learning. It was not, however, until 1776, five years after Helvétius' death, that the lodge opened with ten charter members.[128] The following year there were sixty members; by 1779, one hundred sixty. Mme Helvétius—"Notre Dame d'Auteuil," as Franklin called her—was the guardian angel of the Loge des Neuf Sœurs. Many of the members were recruited from her salon, and the first two yearly meetings were held in her home, "la loge parisienne se trouvant être, en quelque sorte, le dédoublement du salon d'Auteuil." [129]

The Loge des Neuf Sœurs, as a champion of *philosophie,* was constantly at odds with the Grand Orient, and only the mastery of Benjamin Franklin [130] saved it from dissolution. In the rapid expansion of the lodge, some of the most eminent names of the period appear on its rosters: the lawyers, Elie de Beaumont, Dupaty, Legrand de Laleu, and Pastoret; the painters Greuze and Monnet; the sculptor Houdon; the musician Piccinni; the naturalists Forster and Yzquierdo; Dr. Guillotin, Count de Stroganoff, the Prince de Salm, John Paul Jones, the poet Roucher, Court de Gébelin, Dupuis, and—most important of all—Voltaire.[131] Yet, despite its Blue Lodge and Newtonian learnings, the Neuf Sœurs was not free from cabalism and interest in the "esprits qui président aux astres." [132] The poet Parny caught the spirit of the lodge—the same spirit which animates the works of Gébelin and Bailly, when he wrote in his "Cantate pour la Loge des Neuf Sœurs":

> Vous ne gronderez plus, tempêtes passagères.
> Ainsi que le repos, les arts sont nécessaires.
> Qu'ils renaissent toujours chéris,
> La France à leurs bienfaits est encore sensible;
> Et nos fidèles mains de leur temple paisible
> Relèvent les nobles débris.[133]

The existence of the Neuf Sœurs is fair evidence that the ideals expressed in the phrase *le grand ordre* existed among the *philosophes* as well as among the illuminati. These ideals attracted numerous enlightened men, because they were based on science and history and claimed to be authentic documents of great cosmic laws with titles of legitimacy going back to the very origin of the world. History was no longer the object of purely antiquarian curiosity, but the repository of truth and understanding which would bring about the new golden age.

Bailly did not find this system ready-made. It was his own thinking that led him to accept many of the same principles which found expression in the works of his masonic friends and which led him ultimately to join forces with them. The belief in the law, the grand order, the universal language, and the sublime philosophy which he found among the ancients corresponded with the utopian ideas of his contemporaries and prepared his mind for the golden era with which he confused the Revolution.

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[128] The list is an interesting one: Joseph-Jérôme de Lalande (1732–1807), the celebrated astronomer and academician, longtime friend of Bailly, was *Vénérable* (master). Abbé Cordier de Saint-Firmin (1730–1816), author. Pierre-Nicolas Le Changeux (1740–1800), physicist, physiologist, and botanist, author of *Traité des extrêmes* (1762). Abbé Robin, author of *Voyage dans l'Amérique en 1781.* Michel de Cubières, *écuyer* to the comtesse d'Artois, friend of Bailly and of Fanny de Beauharnais. Nicolas Fallet (1753–1801), poet, dramatist, and editor of the *Gazette de France.* Jean-François Cailhava (1731–1813), dramatist and critic. Charles-Georges-Thomas Garnier (1746–1795), another dramatist and poet whose works appeared in the *Mercure de France.* Chauvet, listed simply as "de l'Académie des Sciences de Bordeaux." Evariste-Désiré Desforges de Parny (1753–1814), Voltaire's "cher Tibulle," whose erotic poetry created quite a furore.

[129] Amiable, 18. Mme Helvétius' house was in fact at 59, rue d'Auteuil, in the village of Passy. The house was owned after her death by Count Rumford who married Lavoisier's widow. See Société historique d'Auteuil et de Passy, *Bulletin* 2: 18.

[130] Franklin was past Grand Master of Freemasonry in the American colonies and its chief propagandist and publicist. He was a very active master and used the Neuf Sœurs as a channel for the popularization of American revolutionary ideas. But his great tact allayed any suspicion of subversive activities.

[131] These names appear in the *Tableau des frères de la loge des Neuf Sœurs* (1779) reproduced textually in Amiable.

[132] See Viatte **1**: 105–106 for an enumeration of the mystic elements of eighteenth-century Freemasonry.

[133] *Œuvres, élégies et poésies diverses,* Paris, Garnier, 1861, 393.

V. RATIONALISM *vs.* ILLUMINISM

The history of modern astronomy, letters on the Atlantis of Plato, literary fame, the essay on fables, membership in the French Academy

> Les systèmes sont utiles; nous disons plus, ils sont nécessaires. Les vérités qui ne sont pas classées sont mal connues; ce sont des personnages illustres dont nous devons dire l'origine, la famille et la parenté: en leur créant des généalogies et des alliances, nous soulageons la mémoire. Sans un ordre quelconque, l'homme se perdrait dans la foule des faits; son intelligence succomberait sous la masse de ses connaissances. D'ailleurs cette réduction est conforme à l'économie physique de l'univers. Les hommes, soit par raison ou par instinct, ont toujours senti qu'en faisant dépendre plusieurs vérités d'une seule, ils se rapprocheraient de la nature, qui avec un petit nombre de moyens, produit la variété infinie des choses.
>
> Bailly, *Histoire de l'astronomie moderne.*

Bailly had practically abandoned astronomical observation after his last work on the satellites of Jupiter.[1] Now he was completely absorbed in historical composition. We know that the history of modern astronomy was planned and perhaps begun even before the publication of the ancient astronomy in 1775, for there are numerous references to it in that work. Like the earlier volume, the two which appeared in 1779 offer a fairly straightforward and factual account of events and discoveries based on documented, if not incontrovertible, arguments. They are written in a scholarly manner and make use of many of the same sources available to historians of science today. In some respects, Bailly's work is still without a serious rival.[2]

The ideas generated by his public debate with Voltaire, however, seem to have produced some alterations in the original plan. An *esprit de système* pervades the work. Although Bailly himself refused to admit this, he seems constantly to be proving that *système* is the instrument of progress. An awareness of this new development in his thought is indicated by the appearance of a new and more philosophic "Discours préliminaire" at the head of volume one.

The ostensible reason for this preface is Bailly's defense of the biographical system which he uses. He recognizes that the new history of the eighteenth century is the history of the human spirit, of the multitude and mass of humanity as well as its leaders and its principal milestones. But science, he feels, is somehow above—or apart from—this sceptred sway: "Les sciences, comme les événements, sont les ouvrages des hommes, mais la multitude n'y a point de part; la multitude les ignore ou les regarde avec indifférence: ceux qui les cultivent sont une classe isolée." [3] His history of astronomy must, therefore, necessarily be written in terms of the authors of progress—Hipparchus, Ptolemy, Copernicus, Tycho, etc.

> C'est dans ces grandes têtes que l'esprit humain a vécu; c'est là que les ressources sont nées, que les efforts ont été produits, les succès obtenus. La science a été moulée dans leurs conceptions, a reçu l'empreinte de leur esprit; c'est donc là que réside réellement son histoire. Nous ne voyons que des hommes qui se succèdent, qui ajoutent plus ou moins à ce dépôt, qui embellissent ou qui dégradent l'édifice des sciences; mais ce long travail de l'espèce est le résultat des travaux particuliers. La science n'est que le produit, la succession des opérations du génie, et son histoire est l'histoire des hommes et de leurs pensées.[4]

But Bailly has more to say than this. The "Discours" is also a statement of the eighteenth-century ideal of perfectibility through knowledge. Carl Becker has pointed out [5] that the keywords of the century were *nature, natural law, first cause, reason, sentiment, humanity,* and *perfectibility.* From Vico to Condorcet, historians had the apocalyptic vision of an earthly paradise that would be achieved through the understanding of nature.[6] We have seen Court de Gébelin's corollary thesis that the riddle of nature may be solved by the study of the past. Bailly's philosophy combines these elements; his history, partly intended for astronomers, is "encore destiné aux jeunes gens qu'il faut enflammer de l'amour de la science. Quand ils verront la nature, ils l'admireront; elle a des secrets qui leur sont réservés. . . . " [7] It would be untrue to paint Bailly as a fanatic of progress, however. In the ancient astronomy he had already said on this point:

> La science n'aura atteint son but que lorsqu'elle aura tout connu et tout expliqué. Elle a fait et elle fait encore

[1] His last recorded observation is that of a total eclipse of the moon on July 30, 1776, with Jeaurat at the Observatoire Royal. MEM AC SCI 1776: 431–432.

[2] This is, of course, a dangerous generalization. Bailly's work has been superseded in specific aspects. See, for example, T. L. Heath, *Greek astronomy,* New York, Dutton, 1932. However, there is no single work of the scope of Bailly's. Houzeau and Lancaster, *Bibliographie générale* **1** (1887) contains a 300 page historical introduction which does not add much to Bailly.

[3] ASTR MOD **1**: xiii.

[4] *Ibid.* **1**: xvi.

[5] *The heavenly city of the eighteenth century philosophers,* 47.

[6] *Cf.* Priestley, *An essay on the first principles of government,* 5, 1771: " . . . whatever was the beginning of this world, the end will be glorious and paradisaical, beyond what our imaginations can now conceive."

[7] ASTR MOD **1**: vi.

des progrès rapides; mais sa destinée est d'approcher sans cesse de ce terme, et de n'y jamais atteindre.[8]

In the relatively narrow field of astronomy, little had been written in the way of history as Bailly envisaged it. Riccioli, Vossius, Gassendi, and Cassini had published lives of various astronomers, catalogues of discoveries or almagests, but only three major works may in any sense be regarded as real histories of astronomy. They are Johann Friedrich Weidler's *Historia astronomica,* Wittenberg, Schwarz, 1741; Jean Etienne Montucla's *Histoire des mathématiques,* Paris, Jombert, 1758 (which, as has been noted, was only partially concerned with astronomy); and George Costard's *History of Astronomy,* London, 1767. But these works were designed for the scientist and not for a wide reading public.[9] It was Bailly's ambition to write for the intelligent layman as well as for the astronomer. Voltaire had shown the way in his *Eléments de la philosophie de Newton.* Bailly, like Descartes, was convinced of the wide diffusion of *le bon sens,* and he believed that knowledge was accessible to all.

> Les connaissances les plus élevées appartiennent également à tous les hommes. Nous y sommes parvenus par degrés; les moyens de recherche ont été pris dans la nature, nous l'avons soumise en employant sa puissance contre elle-même; les découvertes sont les œuvres des hommes: il n'y a donc rien dans ces connaissances, dans ces moyens, dans ces découvertes, qui ne puisse être saisi par des lecteurs attentifs. La lecture de l'histoire des sciences ne demande pas que l'on soit savant, elle est un moyen de le devenir. La vérité a des traits qui doivent frapper tout le monde, quand elle est exposée sans voile. . . .[10]

The two volume work which appeared in 1779, *L'Histoire de l'astronomie moderne, depuis la fondation de l'école d'Alexandrie jusqu'à l'époque de 1730,* is an instructive and beautifully written account of man's slow but steady conquest of knowledge. Here, more successfully than in his earlier or later works, Bailly manages the difficult task of making complex notions sound simple without robbing them of their detail or significance for the initiate. It is a work, said one of Bailly's successors, "où le philosophe peut trouver une lecture agréable, et l'homme du monde une instruction solide."[11]

Bailly discusses the contributions of Aristarchus, Hipparchus, Ptolemy, and the other astronomers of the Alexandrian school. Hipparchus is called the first really modern astronomer, because he was the first to comprehend astronomy as a separate science and because he rejected ancient determinations[12] in favor of his own observation. Ptolemy is criticized for his "esprit de système": "Peut-être même, comme tous les gens à système, a-t-il deviné ce qui devait être et arrangé les faits avant de les observer."[13] But Bailly gives a sympathetic picture of the Ptolemaic system, which was undoubtedly a work of genius and very accurately represented the apparent motions of the heavenly bodies. His main reservation is not the mathematical impossibility of the system, but its complication:

> Quand on veut expliquer les faits de la nature, en multipliant les secours, on est sûr de s'éloigner d'elle, et il y a moins de mérite et de génie dans les explications: il faut faire, comme elle, beaucoup avec peu de chose.[14]

This insistence on the simpler of any two solutions to a problem is of course the result of Bailly's indoctrination in Newtonian physics and his own experience as a theorist, and it is the *basso ostinato* of all Bailly's philosophy. When, after describing the almost fourteen-century-long acceptance of the Ptolemaic theory, Bailly comes to relate the resistance of that theory to the new ideas of Copernicus, he returns to this fundamental idea:

> Toutes ces absurdités n'ont d'autre objet que de laisser un grain de sable en repos dans un coin de l'univers. On les épargne toutes, en faisant mouvoir tous les jours ce grain de sable sur lui-même. Il est bon d'observer que ceux qui seraient tentés de nier ce mouvement ne peuvent point prouver qu'il n'existe pas; les apparences sont absolument les mêmes, soit que le ciel se meuve autour de notre globe, soit que notre globe se meuve sur lui-même. Le choix est donc au moins libre entre ces deux suppositions; et ce choix n'est plus libre lorsqu'il doit avoir lieu entre des causes absurdes, même impossibles, et une cause simple et vraisemblable.[15]

Tycho's remarkable observations fail to outweigh his equally remarkable but complicated theory of the heavens, and he is branded as a retarder of progress. Kepler is back on the right track because "l'instinct du génie le persuada de la simplicité des causes."[16] From the time of Galileo on, Bailly regards the principle of simplicity as proved and established in the scientific world. Curiously enough, it is that principle, according to Bailly, which led Descartes astray. In an interesting passage which is too long for textual quotation here,[17]

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[8] ASTR ANC, iii.

[9] It is true that there had appeared in England in 1756 Ferguson's *Astronomy explained upon Sir Isaac Newton's principles and made easy to those who have not studied mathematics,* but this work does not appear to have been widely known in France. Bailly makes no mention of it, although he cites Weidler, Montucla, and Costard extensively.

[10] ASTR MOD **1**: v–vi.

[11] Voiron, *Histoire de l'astronomie,* 1.

[12] It is not uncommon for Bailly to condemn in others what he himself practices. The whole of pre-Alexandrian Greek astronomy is criticized for its acceptance of ancient calculations, yet Bailly uses those same calculations in proof of his favorite theory.

[13] In one place Bailly writes, "Si nous avons conçu l'idée d'un ancien état des sciences . . . cette idée n'est point née de l'esprit de système: c'est le résultat des faits . . ." (ASTR MOD **1**: 1–2); but elsewhere, in praise of the work of Copernicus, Kepler and Newton, he says, "Ces découvertes éternelles sont cependant le produit des systèmes." (*Ibid.* **1**: 336.)

[14] *Ibid.* **1**: 195.

[15] *Ibid.* **1**: 347.

[16] *Ibid.* **1**: xv.

[17] *Ibid.* **2**: 180–181.

he outlines the dilemma or rather the hazards of a philosophy based on simple and self-evident first principles. It is not easy to understand why the truth should have escaped Descartes and unfolded so readily to Newton. The difference, Bailly suggests, is in the last analysis one of capacity. "Toutes les lumières ne sont pas renfermées dans une seule tête; l'homme le plus élevé peut être encore averti. Newton était persuadé de cette vérité que tant d'hommes ignorent. . . ." [18]

Aside from the main, dramatic plot of the advances and reverses of astronomy through the ages, Bailly has given the reader a number of secondary themes and discursive interludes. There are two chapters on astronomical instruments, two on the calendar, two on linear measure, one on methods of observation, one on the role of academies, a discourse on medieval astrology, and a discourse on the nature of luminous bodies. The most interesting of these are, from the critic's point of view, the discussion of measure (particularly ancient measure), where modern research sheds some light on the accuracy of Bailly's methods, and the discourse on astrology, where Bailly has something to say on the religious issue.

Much of Bailly's research on linear measure [19] seems to have found its way into the fourth chapter of volume one of the modern astronomy. The work is not original, but represents a synthesis of eighteenth-century inquiry, principally by Cassini, Delisle, Fréret, and d'Anville.[20] The question for Bailly is one of verifying classical measures of the earth's circumference. Five such measures have been handed down to us:

Aristotle or Eudoxus	c. 4th cent. B.C.	400,000 stades
Eratosthenes	c. 3rd cent. B.C.	250,000 "
Posidonius	c. 2nd cent. B.C.	240,000 "
Cleomedes	c. 2nd cent. B.C.	300,000 "
Claudius Ptolemy	c. 2nd cent. A.D.	180,000 "

The problem was to convert the stades into some fixed standard of measure (the Greek stade varied from 7 to 10 to the Roman mile) in order to determine the accuracy of these estimates. Fréret and d'Anville were in fundamental agreement that there were at least four distinct Greek stades which were in the ratio of 9:12:15:20. Four of the classic estimates, those of 180,000; 240,000; 300,000; and 400,000 were in the same ratio, "par où l'on arrive à cette conclusion singulière, mais évidente, que les quatre déterminations ne sont qu'une seule et même mesure, rapportée et traduite en stades différents." [21] "Celle de 400,000, attribuée par Aristote aux anciens mathématiciens, doit être la première; les autres ne sont que des copies, ou des transformations." [22] Converted to *toises* [23] according to the tables of d'Anville *et al.*, these measures come within a small fraction of eighteenth-century determinations of the earth's circumference. Bailly supposed the earliest measure to be the work of his ancient people, handed down to Aristotle via the Babylonians; he believed that Eratosthenes' was the first Greek measure made by observation, which would account for its greater error; Posidonius' figure was a verification of the exactitude of ancient measure; and Cleomedes' and Ptolemy's figures were simply conversions of Posidonius'.

Modern historians have shown that of these various estimates, the only one for which there is direct evidence for a rate of conversion is Eratosthenes' stade. Converted to the Egyptian *schoenus*, which is accurately known, Eratosthenes' measure of the earth's circumference works out to 39,690 kilometers.[24] But Professor Aubrey Diller gives credence to the theory that there were at least two stades with a 3:4 ratio, and he sees in the 180,000 stades and 240,000 stades one and the same measure. These, he suggests, are a conversion of Eratosthenes' figure.[25] If this reasoning be accepted, Bailly was right in reducing three of the five ancient measures to the same standard. But if three measures could be resolved by this ratio, why not the other two, of 400,000 and 300,000 stades respectively? Mr. Diller does not seriously discuss these measurements reported by Aristotle and Cleomedes. We may therefore regard them as unverified, if not unverifiable, and perhaps assign them to Bailly's "esprit de système." This comparison with modern findings tends to show, however, the accuracy of Bailly's sources and the intelligence of his methods. If a statistical appraisal could be placed on his work, it might even be suggested that it was about three-fifths accurate!

The remaining phase of the modern astronomy which bears some discussion is the discourse on astrology. Bailly was disturbed that Tycho Brahe who was a brilliant observer should also have been an ardent defender of astrology. But astrology he had defined in the ancient astronomy as a manifestation of materialism, and Tycho was not primarily a materialist. "Nier la force et l'influence des astres, c'est, dit-il, détruire la sagesse et la providence de Dieu. . . ." [26] Tycho saw in the heavens, and particularly in his own system of the heavens, a confirmation of the scriptures or, according to Bailly, of several passages "où l'écriture parle le langage vulgaire." [27] It was for reasons of faith that Tycho rejected the Copernican system. It is important to note that when Bailly wrote his modern astronomy,

[18] *Ibid.* **2**: 560.

[19] It will be remembered that Bailly referred to a "mémoire sur les mesures longues . . . lu à la séance publique de l'Académie des Sciences le 17 Avril 1776" in ORIG SCI, 148.

[20] In MEM AC SCI and MEM AC INSC. See especially d'Anville, *Traité des mesures itinéraires anciennes et modernes*, 1769.

[21] ASTR MOD **1**: 150.

[22] *Ibid.* **1**: 157.

[23] The *toise* = 1.949 meters.

[24] The present estimate of the earth's mean circumference is 40,120 kilometers.

[25] Diller, The ancient measurements of the earth, in *Isis* **40** (1), no. 119: 6–9.

[26] ASTR MOD **1**: 429.

[27] *Ibid.* **1**: 418.

Galileo's works were still on the *Index*,[28] and a faithful or cautious scientist like Bailly had to think twice about the delicate balance between the divine word and human experience. Bailly was not a very bold man, and he put his responses to Tycho on the religious question in the form of an attack on astrology.

> La raison vous enseigne que tout est possible à Dieu; mais dans ces choses, qui ne sont pas révélées, l'expérience seule peut vous apprendre ce qu'il a fait; c'est donc l'expérience qu'il faut consulter. . . .[29]
>
> La religion, qui se propose uniquement de conduire l'homme à Dieu, n'a point pour objet de l'éclairer sur les sciences humaines. Quand elle cite leurs vérités et leurs opinions, ce sont celles du temps; ce sont celles qui peuvent être entendues. Elle ne prévient point la postérité, et Dieu n'a employé dans ce genre d'autre révélation que celle du génie. C'était dès lors le jugement de Paul III, du cardinal Schomberg, de plusieurs évêques. On s'est étonné que Tycho eût jugé autrement que ces prélats. . . .[30]

But even these cautious words were not to spare Bailly from the attacks of bigotry.[31]

The modern astronomy confirms two tendencies in Bailly's thinking: devotion to the idea of progress and a preoccupation with systems. The two are not mutually exclusive. Indeed, in our own day they continue to go hand in hand. But the urge to simplify, to reconcile, to generalize was the weakness of Bailly's work, and he constantly applied this method to categories of knowledge where it was inapplicable. When he applied it to ancient history, he deduced a sublime philosophy and a high state of civilization at the very beginning. This notion was contrary to the idea of progress. Although Bailly found numerous opportunities in the modern astronomy to make new allusions to the ancient people whom he had posited in the *Lettres sur l'origine des sciences*, I do not believe that Bailly was immediately concerned with extending that theory or would have done so, were it not for Voltaire's visit to Paris in 1778.

We know the details of the monumental reception offered to Voltaire on that occasion—the special meetings of the academies, the performances at the Comédie, the initiation into the Loge des Neuf Sœurs, etc. It seems rather more than a coincidence that Bailly should have resumed his letters to Voltaire on January 16, 1778, after a year's break in their correspondence. The *Lettres sur l'Atlantide de Platon*, as the new volume was called, seem to have been written after the main body of the modern astronomy was finished, for there is no evidence of their development in the history, and rushed to completion in advance of that work. Bailly refers in his first letter to the "histoire de l'astronomie moderne que je vais publier incessamment,"[32] and, although both works bear the date 1779, the letters on the Atlantis are mentioned in Grimm's correspondence for November, 1778. The last of these letters is dated May 12, 1778. Bailly says in his *avertissement*, "Ces lettres ont été écrites avant la mort du grand homme que nous venons de perdre; elles ne lui avaient point encore été communiquées." It is clear then that Bailly had hoped to present the finished work to Voltaire during his stay in Paris and that that hope was shattered by Voltaire's death on May 30. The letters were probably begun as soon as Bailly heard the news of Voltaire's proposed journey. During February and the first days of March, Voltaire lay ill at the Hôtel de Villette and could not be disturbed. Then the rehearsals and performance of *Irène* kept him occupied until the end of March. On March 30, he was at the Académie Française; on April 7, at the Loge des Neuf Sœurs; on April 11, at the duc de Chartres'[33]; on April 27, at the Académie Française again and at the Comédie to see *Alzire*; on May 7, at the Académie des Sciences. It is more than likely that Bailly was present at one or more of these occasions, but it is not possible to say whether he was personally presented to Voltaire. In any case it is difficult to imagine him importuning the elderly philosopher with talk of Atlanteans when such men as Franklin and Lalande—not to mention the abbé Gaultier—were finding it difficult to interview him. The letters on the Atlantis do not show the same missionary spirit as the first letters to Voltaire; "elles n'avaient point l'objet de convaincre M. de Voltaire; ce n'est pas à 85 ans qu'on change ses opinions pour des opinions opposées."[34] Whether they be "pédantesque et sot bavardage" as one detractor[35] has called them, or the search for historical truth which Bailly meant them to be, it would be unjust to disregard one startling fact. Bailly, far from converting Voltaire, is himself converted. The letters may, therefore, in all fairness to their author, be regarded as the homage of a self-styled opponent who was in the process of becoming a disciple.

Bailly reproduces at the head of the letters Voltaire's acknowledgment of February 27, 1777, the gist of which was that Voltaire, while open to conviction, wanted written proof of the ancient race. The new volume is an attempt to find that proof in the written records of antiquity. The principal sources are Plato, Homer, Diodorus of Sicily, Sanchoniathon, and Hesiod. Bailly's first undertaking is to demonstrate that Plato's account of Atlantis in the *Critias* and *Timaeus* is not a work of fiction. The great nation founded by Uranus and ruled over successively by Hyperion, Atlas, Saturn, and Jupiter is a historical fact:

[28] *Ibid.* **2**: 132, note *b*.
[29] *Ibid.* **1**: 432.
[30] *Ibid.* **1**: 418.
[31] See *infra*, pp. 477–478.
[32] ATLAN, 13.
[33] It would be interesting to know the motive of this visit. The duc de Chartres was present at Voltaire's initiation on April 7, and the event took place according to Amiable at the "ancien noviciat des Jésuites"—i.e. at the Grand Orient.
[34] ATLAN, *Avertissement*.
[35] Nourrisson, 345.

C'est une étrange manie de prétendre raconter comment s'est formé le monde que nous habitons, le monde qui existait lorsque nous n'existions encore. . . . Pour les peuples qui ont oublié Dieu, le commencement du monde est le commencement connu de la race humaine. Au-delà sont les ténèbres d'un abîme impénétrable: . . . mais immédiatement sur ses bords, sur le sommet du temps et de l'existence, ils ont placé leurs ancêtres qu'ils regardaient comme les premiers hommes; et ces ancêtres sont ceux des Atlantes.[36]

Bailly points out that references to Atlantis in Plato, Diodorus, Strabo, Pliny, Euripides, etc., vary in detail, and concludes from this fact that "il y avait donc un fond d'histoire ou de tradition; il y avait donc des sources originales où ces écrivains ont puisé comme Platon." [37]

Bailly finds in Plato's account evidence that the Atlanteans were the ancestors of the Greeks and the Egyptians, and he interprets Plato's story of the invasion of Athens by the Atlanteans and the heroic resistance of that city as proof of successive waves of invasions. But Diodorus also links the Atlanteans with the history of Egypt, and Sanchoniathon, without naming the Atlanteans, describes a similar race as the founders of Phœnicia. "Voilà donc trois grandes nations qui sont de la race d'Atlas." [38] "Quand le mot Atlas et tous ses dérivés seraient allégoriques, ce peuple est celui que je nomme Atlantique, ce peuple est celui qui est sorti de l'île de Platon." [39] So far so good, but what of the tradition which placed the island of Atlantis in the Atlantic Ocean beyond the pillars of Hercules? Bailly examines in turn and rejects the arguments for identifying Atlantis with America or the Canaries.[40] The real reason for assigning this location to Atlantis, he says, is the fact that Plato placed it beyond the pillars of Hercules, and subsequent historians have been misled by imagining that Gibraltar was the site of these pillars. They are, according to Bailly, only the attributes of the god, which appear with his effigy in temples dedicated to him and are no indication at all: "Platon . . . n'aurait pu mieux s'exprimer, s'il eût voulu tromper la postérité." [41]

Nommer ces colonnes, c'était indiquer un temple d'Hercule; ces colonnes annonçaient encore des bornes; elles étaient les limites et les repos de la course de ce fameux voyageur; les temples d'Hercule sont ses stations. Je n'examine point si Hercule est un chef réel, déifié après sa mort, ou si c'est un emblème de la nature; mais je vois un peuple qui se transporte de pays en pays avec son Dieu, qui le pose à chaque lieu où il arrive, où il demeure, et qui dressant un temple pour y prier, y déploie les signes de son culte et y inscrit le terme actuel de ses voyages.[42]

Herodotus had said that the Atlantic Ocean was none other than the Red Sea lying beyond the temple of Hercules at Tyre. Strabo and Diodorus had placed Arabia on the shores of the Atlantic. A contemporary of Bailly [43] placed Atlantis in Palestine. But these determinations do not satisfactorily explain the origins of the Asiatic peoples or satisfy Bailly's conclusions, based on astronomical and other evidence, in favor of an origin of civilization in the northern latitudes. In Strabo, however, he found mention of the descent of the Scythians from their mountains and the founding of a civilization in Cappadocia and Phrygia by their leader Acmon. This Acmon, according to Diodorus, was the legendary father of Uranus. Another ancient source says that the Adonis cult was introduced into Phœnicia by Deucalion, a Scythian, son or descendant of Prometheus. It is commonly said that Prometheus' mother was Asia; his brother, Atlas (i.e. one of the rulers of Atlantis); and the rock to which he was chained, the Caucasus. Following Macrobius and Plutarch, Bailly judges the Adonis cult to be the same as the worship of Apollo in Greece and of Osiris in Egypt. Applying the astronomical explanation which he had so frequently used to the deities of Greece, Egypt and Phœnicia, Bailly finds them all related to sun or sky worship and native to the latitudes where the Scythians originated.

Then, turning to the Persians, Bailly relates, mostly out of Herbelot,[44] the legends of the Dives and the Peris, which he regards as no more fictional than Plato's account of the Atlantis. As in Plato, there is a story of a powerful (and perhaps wicked) race—the Dives, which repeatedly invaded and harassed an enlightened and civilized people—the Peris, from whom the Persians claim descent. The mountains of Caf, which were the stronghold of the Dives, are identified with the Caucasus also. Thus Bailly pictures a common origin for the inhabitants of the Middle East, Egypt, and Asia Minor; they are the vestiges of successive waves of migration from the area to the north of the Caucasus.

Indians and Chinese, too, have their traditions of migration, of origins behind the mountains. The Brahmins are regarded as the vestiges of a civilized race that descended from Tibet, bringing their language with them; and in China tradition has it that Shansi province, in the northwest, was the first inhabited. Bailly supposes, then, that all the peoples of Asia emerged at some remote time from the high central plateau

[36] ATLAN, 72–74.
[37] *Ibid.*, 48.
[38] *Ibid.*, 76.
[39] *Ibid.*, 79.
[40] In ASTR MOD 1: 289 Bailly had suggested that "les peuples des deux mondes ont une même origine. Et dans cette supposition, comme l'Amérique n'a pu être peuplée que par le nord, il semble naturel de conclure que cette origine commune a été placée au nord de la terre, où les deux continents se réunissent peut-être par une communication encore ignorée."
[41] ATLAN, 83.
[42] *Ibid.*, 109.
[43] Frédéric-Charles Baer (1719–1797), Protestant theologian and professor of theology at Strasbourg, corresponding member of the Academy of Sciences, author of an *Essai historique et critique sur les Atlantiques*, Paris, 1762.
[44] *Bibliothèque orientale ou dictionnaire universel, contenant généralement tout ce qui regarde la connaissance des peuples de l'Orient . . .*, Paris, 1697.

of Asia, following first the mountain passes, then the rivers—the Yangtze, the Ganges, the Indus, the Tigris and the Euphrates—and the plains to warmer and more pleasant climes where art and science flourished.

Je vois, donc, Monsieur, le mur et les palissades de la Corée, la grande muraille de la Chine, le rempart de Gog, les portes Caspiennes du Caucase, ouvrages de l'art, se joindre aux montagnes escarpées, aux fortifications de la nature, pour former une vaste circonvallation, qui sépare le midi d'avec le nord de l'Asie. Ce rempart, placé à la Chine à la hauteur du 40° degré de latitude, placé à la hauteur du 42° vers Derbend, de la mer Caspienne à la mer Noire, se relève vers le nord dans l'intervalle compté entre la Chine et la mer Caspienne; il se porte jusque vers le 48° degré de latitude, pour atteindre la distance de l'équateur et la demeure du peuple instituteur que j'ai déjà soupçonnée. Ce peuple savant habitait sans doute en deçà des montagnes. Au-delà sont restées les mœurs agrestes, l'ignorance; dans l'intérieur la civilisation s'est établie, les lumières sont nées; et ces barrières élevées contre le Nord étaient la ligne de démarcation. . . .[45]

. . . en même temps que cette chaîne est une barrière, elle est encore une commune origine.[46]

This theory has found pretty wide acceptance among modern ethnologists.[47] The remarkable idea here is that Bailly is beginning to abandon the fiction of the ancient golden age: "dans l'intérieur la civilisation s'est établie"—not *re*-established as he had previously held, but established for the first time. And the home of the Atlanteans had still to be found. There is, after all, something to Bailly's promise that he will write "en cherchant la lumière."[48]

Examining the plains to the north of the Himalayas, Bailly finds from north to south the reverse of the conditions existing in China, India, and Persia. Flat and well-watered lands give way to barren foothills and forbidding mountains. The only motive which could induce migrating tribes to cross such obstacles would be climatic change, and the Buffon theory of the diminution of the earth's heat supplies that motive. Archeological discoveries in north central Asia in the vicinity of Krasnojarsk had revealed stone and bronze age implements worked with a certain skill which obviously antedated the Mongolian (iron age) occupation of that area. On this evidence Bailly postulated another step in the migration of ancient peoples, following upstream from the Arctic Ocean the numerous rivers of Siberia—the Ob, the Lena, the Yenisei, and the Irtysh.

For lack of recorded evidence of these migrations, Bailly turns to the field of etymology.

Les langues bien connues, bien étudiées peuvent . . . révéler l'origine des peuples, leur parenté, les pays qu'ils ont habités, le terme des connaissances où ils sont arrivés et le degré de maturité de leur esprit. . . . Personne n'a, ce me semble, plus avancé cette science par des travaux multipliés et par des découvertes heureuses que M. de Gébelin. Il a rapproché toutes les langues, il a réduit tous les mots à leurs primitifs, il en a séparé encore les additions nationales; le reste qui se trouve commun à toutes les langues, appartient à une langue primitive. Il y a donc une langue primitive, et M. de Gébelin vous la promet, lorsque son travail aura parcouru et dépouillé toutes les langues pour la recomposer; ce sera une grande découverte de notre siècle.[49]

Bailly was willing to assist this recomposition, but most of his etymologies are taken from Rüdbeck[50] and are fantastic, to say the least.[51] Here again is Bailly's mania for over-simplification of an exacting study; he has perceived the kernel of truth in Gébelin's notion, but is too anxious to exploit the implications. By a remarkable succession of etymologies we are brought to understand that the Greek underworld, Tartarus, the Elysian fields, the gardens of the Hesperides, etc. are all of Nordic invention, and this fact is confirmed by the witness of the poets who place these elusive lands "aux extrémités du monde et dans le pays des ténèbres."[52]

With the assistance of quotations from Hesiod, Homer, Pliny, Plutarch, etc., Bailly locates the island of Atlantis in the North Atlantic or Arctic Oceans; it is either Greenland, Iceland, Spitzbergen, or Nova Zembla—"ou quelques îles inconnues, plus avancées, et aujourd'hui inaccessibles par les glaces. . . . Je me garderai bien de faire un choix dans les îles qui subsistent encore et qui sont accessibles. On peut avoir cru que l'île Atlantide était abîmée ou perdue dans la mer, seulement parce qu'on a cessé d'y aller. . . . "[53] Nevertheless, he leans towards Nova Zembla because it has direct access to the Siberian rivers by which route he believes mankind migrated southward.

Having carried and developed his theme with considerable skill, Bailly ends the *Lettres sur l'Atlantide de Platon* on an unresolved chord.

Je prévois, Monsieur, que vous allez me demander si les Atlantes sont le peuple antérieur dont j'ai voulu renouveler la mémoire; cette question est embarrassante. . . . Le livre de l'ancienne histoire est déchiré, le temps en a dispersé et perdu les lambeaux. J'en réunis quelques-uns, et lorsque

[45] ATLAN, 220–221.

[46] *Ibid.*, 226.

[47] See Col. Sir Thomas Hungerford Holdich, "Ethnology" and Sir Charles Norton Edgecumbe Eliot, "History" in article "Asia," *Encyclopædia Brittannica*, 11th edition.

[48] ATLAN, 26.

[49] *Ibid.*, 193–195.

[50] Olaüs Rüdbeck (1630–1702), a doctor of Upsala, author of *Atland eller Manheim*, 3 v., 1677–1698, held that the Biblical paradise and the Atlantis were one and the same and situated on the Scandinavian peninsula. Upsala was flattered with becoming the ancient capital of Uranus. Bailly was familiar with this work and quoted from it occasionally in ASTR ANC and ORIG SCI.

[51] A few examples will serve to demonstrate:

Hercules	< Swedish *heer-culle*,	meaning army chief.
Styx	< Swedish *stegg*,	disagreeable.
Lethe	< Swedish *lata*,	forget.
Minos	< Swedish *mann*,	man.
Rhadamanthus	< Swedish *rad-amen*,	royal judge.
Phlegethon	< Swedish *flogeld*,	fiery meteors.

[52] ATLAN, 369.

[53] *Ibid.*, 415.

j'ai réussi à trouver un sens suivi, je vous propose d'y lire une partie de cette histoire; mais si vous voulez le tout, demandez-le au temps qui nous l'a pris.[54]

On voudrait remonter contre ces générations, considérer ces développements dans leurs cours, voir le bien et l'homme dans son origine, comme on se plaît à remonter un fleuve qui produit nos richesses et dont les bords sont variés et fertiles. Quand on a trouvé la source d'où ces trésors sont sortis, on dit: l'esprit humain est comme ces eaux; il s'accroît et se fortifie en marchant; humble et pauvre dans ses commencements, il s'enrichit de tout ce qu'il rencontre, il fertilise tout ce qu'il touche, et il étonne par la grandeur et la majesté.[55]

This is a far cry from the "peuple . . . qui a précédé et *éclairé* les plus anciens peuples connus" of whom Bailly spoke in the ancient astronomy and his first letters to Voltaire. In exploring the world of antiquity, Bailly has in fact come around to Voltaire's point of view; by his own account the peoples of Tartary and the far north were less civilized than their modern descendants of southern and western Asia and Europe.

Arago, Nourrisson, Sainte-Beuve—in fact all of Bailly's critics and biographers—have regarded the two volumes of letters to Voltaire as consecutive parts of a homogeneous whole. This is a patent error; the sixteen-month break between them might in itself be an indication; but the text is unmistakable. Bailly gradually abandons in the second volume the position he had adopted in the first. He writes more about "l'homme qui est perfectible, qui tous les jours devient, pour ainsi dire, de plus en plus intellectuel," [56] and there is no more talk of a first golden age of which the second is to be an imitation.

The impact of Bailly's ideas on Europe is perhaps exaggerated in a recent work whose author writes:

Et enfin, pour que rien ne manquât à la gloire de Bailly, Voltaire s'émut du bruit fait autour des Atlantes. . . . Quand l'homme qui "tenait son siècle dans sa main" franchit le seuil de la loge des Neuf Sœurs, appuyé au bras de Franklin et de Court de Gébelin, il entra dans le sanctuaire où la doctrine de Bailly éclatait triomphalement.[57]

This "conversion" of Voltaire can be pretty much discounted in view of the tone of his letters to Bailly, Condorcet, and d'Alembert concerning the origin of the sciences and especially in view of Bailly's statement that the letters on the Atlantis were never communicated to him. The same author makes the rash statement that Condorcet applauded the discovery of the primitive people of Selinginskoe. But it will be remembered that Condorcet had called Bailly "frère illuminé." Later, obliged by his position in the Académie Française to receive Bailly into that august body and make a reply to the latter's *discours de réception,* Condorcet was to say somewhat equivocally, "En lisant ces lettres, il faut malgré soi croire à votre peuple hyperboréen, puisque vous avez su le rendre si intéressant." [58] Condorcet never esteemed Bailly as a writer and often referred in conversation to his style as "rempli de toutes les beautés qu'il faut éviter en écrivant." [59]

It is true, however, that the appearance in rapid succession of the letters on the Atlantis and the two volumes of the modern astronomy brought Bailly and his notions very much into the limelight. The moment was auspicious. The preceding year (1778) Buffon had cited the history of ancient astronomy as a work of "sagacité de génie et une profondeur d'érudition." [60] Now the poets and literati hastened to pay their respects. Fanny de Beauharnais publicly honored Bailly with a poem in praise of the *Atlantide:*

De Platon partageant la gloire,
Vous sondez l'abîme des ans,
Et nous montrez ce qu'il faut croire.
Il parlait aux Athéniens,
Peuple léger, frivole, aimable:
Pour instruire un peuple semblable,
Vos talents égalent les siens.
Chaque vérité qu'il suppose,
Vous la prouvez élégamment:
Je retrouve dans votre prose
De la sienne tout l'agrément;
Et tout m'oblige, en ce moment,
De croire à la métempsycose. . . . [61]

The poet Roucher, reviewing the three volumes of astronomy which had appeared in 1775 and 1779, wrote:

Dans un temps où notre littérature perd chaque jour, depuis trois années, ses membres les plus distingués, il est doux et consolant d'annoncer au public qu'il s'élève des hommes non moins dignes de ses hommages et que les générations à venir envieront à la génération présente, qui peut-être n'en est pas digne, puisqu'elle ne les honore pas assez.[62]

It was also about this time that André Chénier conceived the project of his "Epître à Bailly" [63] as the man who had recaptured the history of the earth in the history of the heavens.[64] Even abbé Baudeau, who returned to the attack and monopolized the pages of the *Journal de Paris* for three months [65] with his point by point rebuttal of Bailly's erudition, found that "les agréments de son esprit, la beauté de son style, et l'hon-

[54] *Ibid.,* 450–451.
[55] *Ibid.,* 463.
[56] *Ibid.,* 294.
[57] Le Flamanc, *Les Utopies prérévolutionnaires,* 103.
[58] Mérard de Saint-Just, 49. For the coolness of Condorcet at this reception, see Bachaumont for February 26, 1784.
[59] Condorcet, *Mémoires* **2**: 244.
[60] *Epoques de la nature,* 232.
[61] Vers à M. B. . . . , de l'Académie des Sciences, en recevant de lui le présent de ses *Lettres sur l'Atlantide de Platon*" in *Journal de Paris,* September 4, 1780: 1005–1006. This poem is reprinted in Bailly's posthumous *Recueil,* 278–280.
[62] *Journal de Paris,* August 25, 1780: 966.
[63] Dimoff **1**: 61.
[64] Chénier **3**: 189.
[65] Baudeau's letters to the editor appeared in the issues of September 18, 28; October 4, 10, 15, 21, 27; November 3, 13 and 30, 1780. Cubières later reflected on this lengthy correspondence, "Cette saillie lui était permise, car on sait qu'il devint fou à la fin de ses jours. . . . " (*Recueil,* xx.)

nêteté de ses mœurs méritent certainement les plus grandes éloges." [66]

But the adulation was not limited to the printed page. In 1768 Bailly had been made a member of the Institute of Bologna,[67] and in May, 1778, he was elected to the Royal Academy of Sciences of Stockholm.[68] This honor was probably due to his work on the satellites of Jupiter and the keen interest which the secretary of that academy had for the subject, but it served to advance his prestige at a time when he was writing more popular works. It is said that Benjamin Franklin, whom Bailly met for the first time in 1777, already knew him by reputation.[69] Suddenly Bailly showed signs of becoming a social lion—a sort of literary man of the hour. We find him presenting the habitués of the salons to the new American ambassador. In a letter of September 23, 1779, he writes to Franklin to ask if he may come the following day to introduce the Comtesse de Beauharnais and the Chevalier de Cubières.[70] Dimoff suggests that Bailly became about this period one of the visitors to the salon of "la belle Grecque"—Chénier's mother—where he would have met the poet Le Brun, the Marquis de Brazais, Palissot, Suard, Vigée, etc.[71] We know that André Chénier himself was acquainted with Bailly's works as early as his student days at the Collège de Navarre (1773–1781) where Brisson's class in *physique expérimentale* was filled with Buffon and Bailly, but after he left school Chénier seems to have paid even closer attention to Bailly's prodigious works.[72]

One interesting aspect of Bailly's sudden popularity was his new role of literary critic. Roucher [73] sent him a volume of verse [74] in the spring of 1780 and invited his criticism. Three years later Cubières asked him to comment on his *Eloge de Fontenelle*. These incidents and the substance of Bailly's replies shed considerable light on the tremendous vogue for his books. Roucher admired Bailly for "l'élégance et l'harmonie de style dont le récit est revêtu" and found in him "un digne émule de l'historien de la nature." [75] If Buffon praised Bailly, it was not an honor lightly bestowed. No one had more precise ideas on the art of writing and no one had succeeded so well in practicing that art.[76] If Buffon praised Bailly, it was because he found in Bailly's writing the two basic principles of eloquence: movement and plan. Whatever may be the demerit of Bailly's ideas, there can be no doubt that he possessed them thoroughly, and in writing he skillfully graduated his periods to achieve the forward motion which, according to Buffon, is the essence of good style. These pages offer sufficient examples of Bailly's language to obviate any extra quotations here, but it may be well to take note of some of the Buffonian precepts which he offered to Roucher and to Cubières. To Roucher, on *enjambement:*

> Il me semble que nous désirons dans les vers comme dans la prose certaines périodes d'où naît l'harmonie qui plaît à l'oreille. Cette manière d'interrompre la marche du vers a beaucoup d'effet dans les mouvements rapides et lorsqu'il y a désordre, mais les peintures froides ont besoin de toutes les ressources de l'harmonie. Ne faut-il pas charmer d'autant plus l'oreille que le cœur est moins intéressé? [77]

To the same, on choice of vocabulary:

> Quant aux mots anciens que vous avez fait revivre, aux nouveaux tours que vous avez pu hasarder, j'avoue que j'aime les hardiesses, mais je vous dirai, comme je me suis dit à moi-même, que dans nos commencements nous devons être sobres sur cet article et réserver ces ressources pour la nécessité absolue qui en est l'excuse.[78]

It is reflective of the taste of the day that Bailly consoles Roucher for any suspicion of word-painting.

> Le reproche qu'on vous a fait d'imiter Ronsard et du Bartas me paraît tout à fait ridicule. Votre style est fort et majestueux et presque toujours rempli d'harmonie.[79]

To Cubières, *à propos* of the *Eloge de Fontenelle*, he has something to say on the differences between the written and the spoken word:

> J'en aime infiniment la simplicité, et je suis bien de votre avis que les éloges ainsi traités feraient plus d'effet, du moins pour la lecture tranquille du cabinet: sans doute, que lus et prononcés, ils n'arracheraient pas aussi vivement les suffrages d'un nombre d'hommes assemblés. Les grands

[66] *Journal de Paris,* September 18, 1780: 1061.

[67] Accademia delle scienze di Bologna, *Accademia delle scienze dell'Istituto di Bologna dalla sua origine a tutto il 1880,* ed. by Ercolani, 37.

[68] Svenska Vetenskapsakademien, *Kungl. Svenska Vetenskapsakademien: Personförteckningar 1739–1915,* ed. by Dahlgren, 125.

[69] In the autumn of 1777 Franklin came to live at 1, rue Singer in Passy and thus became a neighbor of Bailly. Arago (**2**: 280) repeats, apparently from Berville, "Notice sur la vie de Bailly," what may well be an apocryphal account of the meeting of these two gentlemen. It is said that Bailly hastened to pay his respects to Franklin, and, after the usual civilities, lapsed into silence, waiting for his host to begin the conversation. Franklin said nothing. Bailly offered him a pinch of tobacco, but Franklin declined with a gesture. This mute communion lasted two hours, until Bailly finally got up to leave. As Franklin escorted him to the door, his only words were "Fort bien!" Berville says, "Bailly aimait à raconter cette anecdote et disait souvent que 'Fort bien' étaient les seuls mots qu'il eût jamais obtenus de Franklin lorsqu'il se trouvait tête à tête avec lui." (*Op. cit.,* x–xi.)

[70] Collected Papers of Benjamin Franklin, Amer. Philos. Soc.

[71] Dimoff **1**: 79.

[72] *Ibid.* **1**: 61, 90–92, 175–176; **2**: 40–93 *passim.*

[73] Jean-Antoine Roucher (1745–1794), friend of Turgot and Dupaty, member of the Loge des Neuf Sœurs. One of those who initiated Chénier to poetry, he perished at the guillotine with him July 25, 1794.

[74] Undoubtedly *Les Mois,* published in 1779.

[75] *Journal de Paris,* August 24, 1780: 962.

[76] The famous *Discours sur le style,* 1753, is very likely the only reception speech at the French Academy which may be called a masterpiece.

[77] Société historique d'Auteuil et de Passy, *Bulletin* **1**: 72.

[78] *Ibid.*

[79] *Ibid.*

mouvements de l'éloquence et la pompe du discours ont plus de puissance sur les hommes, lorsqu'ils sont assez en nombre pour être peuple. . . .[80]

Bailly had obviously taken seriously Buffon's remarks on the first principles of expression. If changing standards of taste make his works sound pompous or florid (and even Macaulay and Gibbon sound dated today), his skill with words won for him the reputation of "écrivain éloquent . . . et parleur disert."[81]

Literary eminence also brought Bailly critics and enemies. We have noted the intemperate attacks of abbé Baudeau. A more serious challenge to Bailly's theories came from Italy. During the same years that Bailly was composing the two volumes of letters to Voltaire, Giovanni Rinaldo Carli was writing a similar series of letters on the antiquity of the Americans, in which he attempted to prove the previous physical union of the two hemispheres and to explain the disappearance of the continent of Atlantis.[82] His book had not yet been published when he encountered Bailly's *Lettres sur l'Atlantide de Platon,* which seemed in large measure to contradict what he had written.

> . . . io me ritrovo in dovere, o di rinunziare alla mia opinione, oppure di determinarmi ad un preciso esame di quelle del Co. di Buffon e di Mr. Bailly, giacché fra loro sono concatenate e conguinte. . . .[83]

Carli's refutation of the Buffon-Bailly theory appeared as the third volume of a revised edition of the *Lettere americane* in 1783.[84]

After paying tribute to "i due più illustri campioni di Francia . . . a' quali la superiorità di dottrina, di penetrazione, di erudizione e di eloquenza . . . hanno dato loro la cittadinanza di tutta l'Europa," Carli gives his readers a brief but accurate résumé of Buffon's theory of the origin of the earth, of Mairan's experiments with temperature, of Bailly's arguments in favor of a northern parent race, and of Voltaire's objections to the foregoing. Although in partial agreement with Buffon, Carli prefers the hypotheses on the earth's origins advanced by Robinet in his *Considérations philosophiques de la gradation naturelle des formes de l'être,* where the existence of a primordial incandescent mass is denied. Carli admits that he is convinced that northern Europe and Asia were once tropical, but he disproves the legend of an uninhabitable torrid zone. In short, he is aware of secular temperature changes over the globe, but feels that all parts of the globe have been habitable. He is cautious in condemning Mairan's notion of internal heat: ". . . forse potrebbesi attribuare il calore del nostro pianeta ad altra cagione; cioè al moto diurno ed annuo, ed al vicendevole peso o sfregamento de' pianeti."[85] This Cartesian hypothesis is followed by the unwarranted supposition that "lungi dal diminuirsi il foco centrale pel successivo raffreddamento del globo, credo che si vada anzi aumentando. . . ."[86]

Carli clearly wishes to clear away the physical basis on which Bailly's system rests, and, in so doing, he offers far more tenuous evidence than Bailly. However, he is on much firmer ground when he deals with the testimony of the ancients whom, he says, Bailly frequently misread. According to Carli, Hesiod, Homer, Plato, Herodotus, Diodorus, and Strabo had a reasonably accurate knowledge of geography, and in any case, nothing of their writings permits the interpretation that Atlantis lay in the polar regions. Neither Berosus nor Sanchoniathon, whom Carli accepts as "i due più antichi scrittori dell'Asia" says anything about Atlantis or Atlanteans in Asia. The Dives and the Peris "sono stati sempre considerati come immagini o geni, ma non uomini." Bailly's story of Gog and Magog is "un poco poetica." In fact, Carli refuses to take seriously any part of Bailly's account:

> Credo però fermamente che Mr. Bailly, appunto come un mago, conosca perfettamente la verità; ma che da una parte fidandosi della sua arte, e dall'altra conoscendo la debolezza degli uomini, abbia voluto prendersi gioco del popolo dei letterati, per imporre alla moltitudine.[87]

According to Carli, Bailly has read too many fictional "harmonies" of antiquity, attempts to reconcile legend and fable with recorded history, with modern scientific knowledge and/or with Biblical accounts. He roundly thrashes Vossius, Pluche, Formont, Rüdbeck, Baer, Court de Gébelin, and a dozen others from whom Bailly has drawn. Gébelin, particularly, receives caustic treatment, although Carli accepts Gropius' view that "una sola lingua doveva esser la madre di tutte."

Carli's book is a good antidote for Bailly in that it brings to light all the weaknesses of his scholarship and his ever-too-eager synthesis. Yet Carli is neither entirely disinterested nor free from *esprit de système,* as his triumphant conclusion shows: "Il mio romanzo adunque, per quanto mi sembra, rimane intatto. . . ."[88] Carli was, in fact, more interested in defending his own account of the ancient world than in discrediting Bailly. He repeatedly pays homage to the work which he is refuting:

> Comunque sia però è certamente maravigliosa l'industria è l'erudizione di Mr. Bailly nel sostenere la sua ipotesi;

[80] Cubières. *Fontenelle, Collardeau et Dorat,* xiv.

[81] Maury, *L'Ancienne Académie des Sciences,* 165.

[82] These letters, addressed to Girolamo Gravisi, Marchese di Pietrapelosa, cover the period 1777–1779. They were first published anonymously in 1780 under the title *Delle lettere americane,* 2 v., Cosmopoli [Florence].

[83] *Le lettere americane. Nuova ed. coretta ed ampliata colla aggiunta della parte III ora per la prima volta impressa* **3**: 4, Cremona, Manini, 1781–1783. This revised edition is dedicated to Benjamin Franklin.

[84] Volume three bears the title: "Parte terza. In cui si esamina l'ipotesi di Mr. Bailly intorno l'Atlantide di Platone e quella del Sig. Conte di Buffon per rispetto al successivo raffreddamento del globo."

[85] *Le lettere americane* (1781–1783) **3**: 29.

[86] *Ibid.* **3**: 45.

[87] *Ibid.* **3**: 84.

[88] *Ibid.* **3**: 212.

onde se questa è un'opera più d'ingegno che di verità, non è perquesta che nel leggerla uno non rimanga sorpreso ed in certa maniera anche convinto.[89]

Carli undoubtedly reflects the contemporary view when he suggests that Bailly's *Atlantide* is an *hors d'œuvre*:

Il capo d'opera d'erudizione e di scienza di Mr. Bailly è la *Storia dell'astronomia antica e moderna.* Quando un' uomo perviene a perfezionare un' opera originale, utile e compiuta in tutte le sue parte, com' è cotesta, rallenta l'intenzione delle sue applicazione in argomenti di minore importanza. Anche gli ozi però e le distrazioni degli uomini grandi sono rispettabili, ed io non acconsentirò mai che un' affar d'opinione e di gioco com' è questo dell' Atlantide rechi per conto mio alcun pregiudizio alla celebrità del nome di Mr. Bailly, nè al gran conto ch'io fo del di lui merito e della di lui solida e singolare dottrina.[90]

Bailly must have been aware of Carli's refutation, but it probably reached him too late to have any influence on his writings. We know that he possessed a copy of the *Lettere americane,*[91] but the third volume containing Carli's objections was not published until 1783, after Bailly had already written the twenty letters which constitute the *Essai sur les fables.* It might perhaps be argued that the publication of Carli's work disinclined Bailly to continue along these lines. But this view is really untenable when one considers the text of the *Essai,* where Bailly had already abandoned his earlier position without benefit of Carli's commentary. The issue was still alive when Carli's letters appeared in a French translation in 1788[92] for, although the letters refuting Bailly and Buffon were omitted, the translator (Lefebvre de Villeneuve) devoted part of his preface and many footnotes to an attack on Bailly and promised to publish a translation of the refutation. But by 1788 Bailly was busy with various academic commissions, and the events of the Revolution were soon to preclude any further antiquarian researches.

Not all of Bailly's critics were so inconsequential as Baudeau or so gentlemanly as Carli. There was also an attack from the party of the *dévots.* We have observed that Bailly was cautious not to expose himself to charges of heresiarchy. He at least paid lip-service to the God of the Christians and to their scriptures. But he was also careful not to let the word of revelation becloud his scientific view of history. Bailly was accused by abbé Royou[93] in the pages of *L'Année littéraire*[94] of substituting a new cosmogony for that of Genesis; by implication, Bailly had denied the scriptural account of the creation of man and of the deluge. Bachaumont's correspondence says, "L'astronome se pique d'être fort religieux; il a porté ses plaintes à M. le Garde des Sceaux d'une inculpation aussi grave."[95] Mérard de Saint-Just claims that official intervention came unsolicited, but he may be wrong in stating that it was Malesherbes who ordered the police to give Royou a dressing-down.[96] In either case, both sources agree that the government was predisposed against the editor of *L'Année littéraire,* and threatened to suppress the paper unless a retraction was published forthwith. But this is only half the story; like Carli, Royou believed that the *Atlantide* was intended to be a hoax, but he went further and inculpated Bailly's honor.

Il ne fut jamais de système plus frivole quant aux moyens, plus absurde quant au fond. M. Bailly lui-même n'y croit pas plus que moi. C'est sûrement un essai qu'il a voulu faire sur la crédulité publique. Il a dit, sans doute, dans le fond de son coeur, "les savants du premier ordre ne daigneront pas me répondre; les journalistes chargés par état de me réfuter, n'auront pas le temps de compulser une centaine de volumes pour relever mes erreurs; le commun des lecteurs sera étourdi par la hardiesse de mes assertions. . . . Dans tous les cas, M. d'Alembert qui cherche à peupler l'Académie française de philosophes, pourra-t-il s'empêcher de couronner un chef-d'œuvre de hardiesse philosophique?"[97]

Bailly is said to have written the text of the retraction, which Royou refused to sign because of its humiliating language. After considerable negotiation in which "les plus graves personnages" intervened, Royou published a statement designed to satisfy Bailly without Royou's losing face:

. . . En effet, en relisant cet article dont je suis l'auteur, je vois que dans le compte que j'ai rendu de cet ouvrage intéressant j'ai peut-être été trop loin en interprétant vos pensées et en vous prêtant des intentions que vous assurez n'être pas les vôtres . . . je vous en fais mes excuses, sans changer cependant l'opinion sur le fond de l'ouvrage. . . .[98]

The matter might have ended there but for Royou's vindictiveness. Several days after his retraction, he denounced Bailly's work to the Archbishop of Paris who appointed two *docteurs de Sorbonne* to examine it—"ce qui alarme M. Bailly, qui vraisemblablement sera obligé de faire une protestation, comme M. de Buffon, de sa soumission à la foi, aux livres saints, et de ne proposer son système que comme hypothétique."[99] Ap-

[89] *Ibid.* **3**: 47–48.

[90] *Ibid.* **3**: 173.

[91] Listed in Debure's sale catalogue of 1798.

[92] *Lettres américaines . . . par M. le comte J. R. Carli,* 2 v., à Boston et se trouve à Paris chez Buisson, 1788.

[93] Abbé Thomas-Maurice Royou (1741–1792), chaplain of the Order of Saint Lazare, professor of philosophy at the Collège de Louis-le-Grand. Royou collaborated with Geoffroy in the "libelle hebdomadaire" *Le Journal de Monsieur,* 1778–1783. This journal was not very successful, and his articles frequently appeared in the Fréron press. He later founded *L'Ami du Roi* (1790).

[94] *L'Année littéraire* 1779, **1**: 217–246, and **2**: 39–72 (February 3 and 27, 1779). It will be remembered that the elder Fréron—Elie Catherine (1719–1776)—had often attacked Voltaire in this journal.

[95] *Op. cit.,* May 11, 1779.

[96] *Op. cit.,* 54–55. Malesherbes was out of public office from 1776 until 1787.

[97] *L'Année littéraire* 1779, **2**: 63–64.

[98] *Ibid.* **3**: 141 (April 29, 1779).

[99] Bachaumont, May 19, 1779.

parently nothing came of the affair, for Bailly made no such submission and there was no further publicity. The reviews of Bailly's later works which appear in *L'Année littéraire* are less vituperative, although not friendly.[100] The effect of this scrape with the ***dévots,*** Bachaumont remarks,[101] was to push Bailly, more or less in spite of himself, towards the Encyclopedic group.

I say "in spite of himself," because it is clear that Bailly was still at war with the Condorcet-d'Alembert clique. Bailly coveted a seat in the French Academy and Buffon's continued patronage led him to believe that he might have it. Three times Bailly presented himself and was defeated, always through the machinations of d'Alembert. On January 10, 1782, when the Academy met to elect a successor to Bernard-Joseph Saurin, a pitched battle was fought between the two factions. The Academy was evenly divided between Condorcet and Bailly, whose long-standing rivalry made this a tense moment in academic history. The votes, of course, were "fixed" in advance, and it seemed that Bailly would win. It was Condorcet, however, who got the seat by a vote of 16 to 15. Accusing fingers were pointed at the aged Comte de Tressan [102] who had switched his vote and at d'Alembert who was accused of "brigues qui avaient les apparences presque criminelles." [103] Bailly let it be known that the treachery was doubly nefarious because, only three months before, he had withdrawn his candidacy in favor of Tressan, out of respect for the latter's merit, age, and rank.[104] Condorcet and d'Alembert thought the whole affair an enormous victory for the *philosophes.* Condorcet stated fatuously, "Nous pouvons nous écrier: 'La vérité a vaincu; le genre humain est sauvé!' " [105] and d'Alembert chortled that he was happier with this victory than if he had squared the circle.[106]

The demand for Bailly's works was sufficient to call for a second edition of the ancient astronomy in 1781. The following year the third and last volume of the modern astronomy appeared covering the years 1730–1782.[107] This is the shortest of the four volumes which make up the history of astronomy. Only two of the six chapters are, in fact, devoted to the progress of astronomy during this period; the rest comprise a discourse on mathematics, general conjectures on the form of the universe, a refutation of Dupuis' article on the constellations, and a closing résumé in which Bailly takes a backward look at the ground covered and hazards a few remarks on the future of astronomy.

The point of departure for this volume is the terminal point of the earlier volumes—i.e. the preeminence of Newtonian doctrine.

> Le phénomène de l'attraction doit donc être regardé comme la base constante de toutes nos recherches. . . . Il faut considérer ce hardi système de Newton comme un magnifique tableau de la nature, où ce puissant génie a dessiné à grands traits les formes principales, en laissant à ses successeurs la gloire de détailler ces formes esquissées, de remplir les vides et d'ajouter la ressemblance de toutes les parties à la vérité de l'ensemble.[108]

Accordingly Bailly is concerned with the perfection of Newtonian principles through better observations, better measurements, finer instruments and, above all, the broadening field of mathematics. Among the achievements of the century he lists the accurate determination of the earth's size and shape from measurements taken in Lapland, France, Peru, and South Africa; Bouguer's and Maskelyne's measurements of gravitation in small bodies; the confirmation of Halley's theory of comets; the enormous strides made in correctly determining the motions of planets and satellites; Bouguer's, Halley's and Mayer's studies in atmospheric refraction; the rapid development in England of aids to navigation, especially Harrison's clocks; the invention of achromatic lenses; etc.

The greatest strides were made, according to Bailly, in the application of dynamics and integral calculus to astronomy.

> Aujourd'hui ces deux sciences se touchent de si près qu'elles semblent se confondre. Un astronome, pour être habile, a besoin d'être géomètre; un géomètre pour s'exercer sur de grands objets, doit avoir les connaissances d'un astronome.[109]

The advances in mathematics made by such men as Euler, Clairaut and d'Alembert [110] hastened the solution of some of the most difficult and delicate of astronomical problems, as, for instance, the problem of three bodies.

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[100] Royou turned his attention to Buffon in succeeding issues of the *Année littéraire.* In November and December he reviewed the newly published *Epoques de la nature,* and in the issues of January 4 and 11, 1780, he wrote an article entitled "Le Monde de verre de M. le Comte de Buffon réduit en poudre, ou Réfutation de sa nouvelle théorie de la terre. . . . " This was still aimed at Bailly, as Buffon subscribed to Bailly's theory of the ancient world. Like Baudeau, Royou constantly paid tribute to Bailly's elegance of style and expression.

[101] *Op. cit.,* May 19, 1779.

[102] Louis-Elisabeth de la Vergne, comte de Tressan (1705–1783), was also a member of the Academy of Sciences.

[103] Masson, 251, and Gassier, 309 and 311. The "brigues" seem to have had to do with various sealed notes that passed between d'Alembert and Tressan. Gassier says categorically that Tressan had promised his vote to both parties.

[104] Bachaumont, February 24, 1782. Ironically, it was Tressan whom Bailly succeeded in 1783.

[105] Masson, 251.

[106] *Ibid.* and Maury, *L'Ancienne Académie des Sciences,* 167.

[107] The title page differs slightly from those of the two preceding volumes; it reads ". . . *depuis l'Ecole d'Alexandrie jusqu'à l'époque de 1782.*" The *privilège* is dated April 17, 1782.

[108] ASTR MOD 3: 331.

[109] *Ibid.* 3: 208.

[110] It is difficult to say whether it was from political motives or from a fine sense of justice that Bailly refrains from indicating in his writings the lack of agreement between d'Alembert and himself. D'Alembert and Condorcet are both referred to frequently in this volume as important contributors to the advance of learning.

Bailly's imagination was fired by the discovery in March of 1781 of what was to become the seventh planet, and he immediately saw its implications:

> L'astre qui nous occupe maintenant, cet astre qui est peut-être une planète, semble nous indiquer que Saturne n'est pas la dernière de notre système; il y en a peut-être beaucoup d'autres, ou jusqu'à présent invisibles ou jusqu'à présent confondues avec les étoiles fixes. Il peut résulter de [la] perfection du télescope un agrandissement du système solaire, une confirmation des lois connues, peut-être de nouvelles lois et de nouveaux phénomènes, enfin des travaux et des succès pour l'esprit humain.[111]

Such a view inevitably leads to speculation on the ultimate nature of the universe. Bailly poses (but does not attempt to answer) some of the questions which have long disturbed thinking men and which continue to occupy a good many pages in contemporary literature. Why do the planets and their satellites revolve in the same direction in the same general plane? Why do the planets rotate in the direction of their revolution? What is the cause of novae and nebulae? What is the motion of the solar system? What set it in motion? What is gravity? "Cette force, cette attraction . . . est-elle en effet une cause primordiale?" [112] Bailly believes that a certain number of nature's secrets will ultimately be learned:

> A ces question hardies, dont quelques-unes resteront insolubles, quels que soient les progrès du temps, dont les autres ont plus ou moins besoin de sa lumière, le sage répondrait peut-être, "je ne sais": mais l'homme passionné, dévoré du désir de connaître, irrité par les barrières que la nature lui oppose, ne se contentera point de cette réponse; il osera imaginer, deviner; il jugera ce qu'il ne peut voir par ce qu'il a vu, et traçant un plan à son activité inquiète, il saura du moins où et comment il doit chercher. Si les hommes avaient toujours écouté cette raison circonspecte, ils n'auraient jamais devancé le temps. . . . La sagesse tranquille, qui n'a que des désirs modérés, est une vertu dans la morale; mais l'inquiétude est le principe du mouvement des esprits; les passions ont tout fait sur la terre. Le besoin de connaitre et celui de la gloire ont précipité les pas des sciences; sans les passions, la société serait encore telle que dans l'état sauvage, et les sciences à leurs premiers commencements.[113]

This is a remarkable example of the eighteenth-century rehabilitation of the passions and one is all the more astonished to find such notions favorably reviewed in the *Année littéraire* where we read: "Rendons graces à M. Bailly de nous avoir ouvert les cieux en renversant le mur d'airain élevé par une morgue pédantesque." [114]

The modern reader, like the eighteenth-century reviewer, however, is apt to see one flaw in the last volume of the modern astronomy. That is the lengthy rebuttal of Dupuis' "Mémoire sur l'origine des constellations et sur l'explication de la fable." Dupuis' system is as simple as it is unlikely. He finds in the rising and setting of the principal stars a key to the heroes and heroines of mythology, their genealogy, adventures, temperaments, etc. Bailly was still anxious to show that myth had a historical origin, but he was more particularly in disagreement with Dupuis' chronology based on the twelve-sign Zodiac. The fifth chapter of volume 3 is devoted to a restatement of his views from the ancient astronomy and the letters on the origin of the sciences. This chapter caused considerable adverse criticism. The anonymous reviewer (who sounds like Royou) wrote: "On est fâché de voir un écrivain aussi estimable renouveller des opinions opposées à la tradition sacrée et au sentiment des historiens profanes." [115] And from Lalande (i.e. from the *philosophe* quarter):

> Bailly ne donna point tout à fait dans le système allégorique des traditions anciennes que le citoyen Dupuis a établi d'une manière victorieuse . . . : ses idées étaient fixes, son parti était pris; et malgré mes efforts, je ne pus le ramener à ce qui me semblait la vérité. Au reste, comme enthousiaste de l'astronomie, je regrettais le temps qu'il employait à des recherches et à des discussions plus curieuses qu'utiles, et qui ne contribuaient point au progrès de l'astronomie, où il était si capable d'influer.[116]

Aside from this one chapter, Bailly scarcely spends more than two or three pages on the prehistoric golden age. In the concluding résumé, discussing the progress that astronomy has made, he reaffirms his belief in "une astronomie qui fut perfectionnée, puis détruite et oubliée" [117] and in the renascence which occurred in China and Babylon "au temps de la fondation des nouveaux empires." [118] He does not suggest, however, that that first astronomy was "perfected" to the same degree as in eighteenth-century France. In fact, he says categorically that this was not the case:

> L'Europe a sur cette antiquité l'avantage du génie; elle s'est procuré des moyens de progrès en créant la géométrie. Cette science manquait absolument aux anciens; nous n'en trouvons nulles traces dans l'Asie; elle n'a paru que dans la Grèce au temps de Platon. Nos moyens pour surpasser la science primitive ont donc été le télescope, qui étend le domaine de nos sens; la géométrie, qui permet de tout approfondir; et le génie, qui ose tout comparer et qui s'élève à la science des causes. Cette science est notre véritable supériorité. Tous les phénomènes sont enchaînés: le système de nos connaissances est ordonné comme la nature; un seul principe nous sert à tout expliquer, comme un seul ressort lui suffit pour faire tout agir.[119]

Thus Bailly ends his monumental work on the optimistic note of progress and perfectibility. It is difficult to imagine that his influence would have been greater if he had composed differently, for this work is definitely his genre. Here is perhaps the illustration of Buffon's favorite theory that "le style c'est l'homme même." Bailly did exert considerable influence on his

[111] ASTR MOD **3**: 342.
[112] *Ibid.* **3**: 215.
[113] *Ibid.*
[114] *L'Année littéraire* 1782, **6**: 252.
[115] *Ibid.* **6**: 243.
[116] Eloge de Bailly, 325.
[117] ASTR MOD **3**: 316.
[118] *Ibid.* **3**: 318.
[119] *Ibid.* **3**: 329–330.

contemporaries—Joseph de Maistre, André Chénier, Mme de Staël, etc. A whole generation was to be familiar with:

> . . . l'hiver ennemi pour envahir la terre
> Roi des antres du Nord: et de glaces armés,
> Ses pas usurpateurs sur nos monts imprimés;
> Et l'œil perçant du verre, en la vaste étendue,
> Allant chercher ces feux qui fuyaient notre vue;
> Aux changements prédits, immuables, fixés,
> Que d'une plume d'or Bailly nous a tracés,
> Aux lois de Cassini les comètes fidèles. . . .[120]

When Bailly was at work on the first two volumes of modern astronomy he produced simultaneously the two volumes of letters to Voltaire. The very format of these books tells us something of the author's intentions. Whereas the history is consigned to large (and weighty) quarto volumes, appropriate to a library table, the letters to Voltaire appeared in slim octavo format which might grace a lady's boudoir. The history (except for volume 3) is filled with footnotes and *éclaircissements;* the letters are as informal as the *Entretiens sur la pluralité des mondes.* It seems clear that Bailly—or his publishers—had in mind two distinct, if overlapping, reading publics. This plan of composition was repeated when Bailly wrote the last volume of the modern astronomy, for it, too, has a companion work. The *Essai sur les fables et sur leur histoire* was written, to be sure, immediately after the publication of the major work, but rapidly[121] and in letter form. Addressed to Mme du Boccage,[122] they are intended to be a continuation of the letters to Voltaire:

> Nous avons perdu le grand homme devant qui j'ai plaidé la cause de l'Asie et des anciens habitants de la terre. J'aimais à lui exposer mes idées. Ce n'était pas seulement pour le consulter; il me semblait, en lui écrivant, qu'il était présent et qu'il m'inspirait par son génie. Je l'ai perdu. Il s'en faut bien cependant que j'aie développé toutes mes idées; il me reste à remplir une partie de la tâche que je m'étais prescrite: j'ai besoin d'un autre génie tutélaire. Agréez, madame, la continuation de cette correspondance. . . .[123]

The choice of this new "génie tutélaire" may have been suggested to Bailly by the somewhat exaggerated esteem which Voltaire had shown for Mme du Boccage:

> Vivre avec vous dans le temple des muses,
> Lire vos vers, et les voir applaudis,
> Malgré l'enfer, le serpent et ses ruses,
> Charmante Eglé, voilà le Paradis.[124]

[120] Chénier, L'Invention, in *Œuvres* **2**: 16.

[121] The twenty published letters were all written between June 30 and October 4, 1782.

[122] Marie-Anne Le Page du Boccage (or Bocage) (1710–1802), the wife of a man of letters, Pierre-Joseph Fiquet du Boccage, was known for her poems *Paradis perdu,* imitated from Milton, *La Mort d'Abel* and *La Colombiade;* a tragedy, *Les Amazones;* and her letters to her sister, Mme du Perron.

[123] FABLES **1**: 4.

[124] *Œuvres* **10**: 543–544.

The *Essai sur les fables* was not published until 1799 and then only in incomplete form,[125] so that it did not have any influence during Bailly's lifetime. We may note here, however, the continuing trend in Bailly's thought away from the first concept of the golden age.

From the outset Bailly had subscribed to a theory not unlike Vico's three ages of civilization—the divine, the heroic, and the human—followed by a period of decadence, after which the cycle begins again. In the *Essai sur les fables,* he is concerned with the divine and the heroic ages. "L'âge d'or est celui d'innocence et celui de l'ignorance, compagnes souvent inséparables."[126] Bailly repeats that all legend envelops a certain kernel of historic truth. *Fabula,* he points out, comes from *fari,* to speak; myth from the Greek *mythos,* speech. Fable and myth, therefore, are merely accounts, and like all accounts they draw on factual memory as well as imagination. He rejects as too narrow the two classic interpretations of myth—the historical, in which gods are deified men, and the allegorical, in which gods are symbols of the forces of nature.

[125] The editor of the two volumes which appeared in 1799, who signed himself simply P****, is probably Cubières (Palmézeaux). In the *avis* we read, "On jugera aisément que ces deux premiers volumes annoncent une suite; aussi existe-t-elle, et elle ne tardera pas à paraître dans le même format. Si on a anticipé de quelque temps sur cette suite, c'est pour faire jouir plus promptement le public dont l'opinion a consacré les productions de cet homme célèbre." Ten years later Cubières wrote (*Recueil,* xlviii), "Bailly a laissé une suite manuscrite de son *Essai sur les fables,* qui est dans les mains de M. Bailly Saint-Paulin, son frère puîné. . . . " In the 1799 work, Cubières acknowledged "la confiance de la veuve Bailly." Mme Bailly died in 1800. As Bailly had no children, it would seem reasonable to suppose that the manuscript in question passed into the hands of Jean-Sylvain's brother after his widow's death, and that he withheld permission for publication. This seems the more likely in view of his attitude expressed in a letter to Cubières in connection with the publication of the *Recueil:* "Vous me dites que vous avez acheté ce manuscrit; je ne crois pas être en droit de vous empêcher d'en disposer de la manière qu'il vous plaira, comme d'une chose vous appartenant, l'ayant payée de votre argent." The reluctance of Bailly Saint-Paulin to allow the publication of his brother's work may be explained by an undocumented assertion in Lefèvre-Deumier, 352, that the Emperor Napoleon proposed to have a rich collected edition published. This would, of course, have inflated the value of Bailly manuscripts. However, the matter is further complicated by Lalande's testimony. He seems to have read the *Essai,* for he notes (Eloge, 325), "En 1781 [*sic*] et en 1782 il composa un grand ouvrage sur l'origine des fables et des religions anciennes, rempli d'érudition et de recherches, et dont la publication lui fera honneur autant qu'elle intéressera les savants." But Cubières refers in 1810 (*Recueil,* lv) to a manuscript "Histoire de l'origine des Perses et des Indiens" and "un ample mémoire sur leurs religions, qui pourraient former environ trois volumes in-4° de cinq ou six cents pages chacun." Mérard de Saint-Just, 177, also speaks of "un grand ouvrage dont il reste des matériaux." Lalande's words, "un ouvrage," would seem to relate the history of the Persians and the Indians and their religions to the *Essai sur les fables,* but Cubières' statement would suggest that they were separate works. Without the missing manuscripts the problem seems incapable of solution.

[126] FABLES **1**: 126.

Ce qui me déplait dans ces systèmes, c'est de voir substituer des explications pénibles à des explications naturelles et vraisemblables. . . . Il me semble qu'une des premières règles dans l'examen des fables, c'est de n'expliquer que ce qui a besoin d'être expliqué. . . . Une autre raison m'éloigne encore de ces systèmes qui expliquent tant de choses. Leur généralité m'effraie; une superstition unique devient une explication universelle. Je ne puis croire que tous les secrets de l'antiquité soient renfermés sous une clef. Je ne puis me persuader que toutes les fables aient été jetées dans le même moule. . . . Les fables doivent avoir plusieurs sources.[127]

This is indeed a departure from the *esprit de système* which is to be found so extensively in the earlier letters. Even more satisfying to the modern reader is Bailly's relinquishment of the system of correspondence by which he had tried to identify gods, heroes and men widely separated in time and space. Of the attempt to identify the characters of pagan mythology with those of the Bible he writes: "C'est une étrange manie que celle de vouloir juger et reformer l'ancienne histoire sur quelques légers rapports dans la vie des différents hommes, sur le sens et l'étymologie des noms." [128]

Bailly is convinced, then, of the fundamental complexity of myth and fable, of the heterogeneity of their origin. He recognizes, further, the extensive modification wrought by time, language, new racial contacts, etc.[129] Most important of all, he differentiates the fable which is the manifestation of race-consciousness (called here "poetic") and the fable which is the work of literary composition (called "philosophic").[130] Proceeding on these assumptions, he sets himself an ambitious threefold objective: the discovery of the sense of the fable, its migrations and metamorphoses, and its point of origin. His method is to work from the known to the unknown, from the modern to the ancient; "nous marcherons contre l'ordre des temps. . . ." [131]

Bailly begins with the mythology of Rome which he regards as largely the result of decadent morality and superstition—"on avait fait des dieux pour chaque passion, pour toutes les actions de la vie et pour tous les besoins, jusqu'au dieu Crepitus!" [132] The Roman accretions are stripped away, leaving only those gods and heroes which Rome shared with Greece.[133] Bailly uses Ovid as a yardstick for the "naturalization" of foreign mythology. He believes that the geography of myth is an indication of its age and provenience. Thus local names applied to myths whose counterparts appear in other lands are an indication of great antiquity and long acclimatization; foreign place names indicate more recent borrowings. When Phaeton falls into the Eridan (the Po) it is because "l'histoire de Phaeton est une fable détachée qui semble appartenir à tous les pays; on peut l'arrêter dans sa course et le faire tomber où l'on veut." [134] The entrance to Hell near Vesuvius proves similarly that "les Romains ont donc pu avoir leur enfer chez eux." [135] But Greek place names in Roman mythology are taken as a sure sign of late borrowing.

Bailly believes that the acclimatization of mythology in Greece is very ancient,[136] but that for the most part it was brought in by successive waves of migration from Asia Minor, Phœnicia and Egypt. The Greeks themselves he relates to the Celts and Nordic tribes; their earliest religion was an earth-cult; their oracles, earthly phenomena. "Ces idées et cette institution n'ont rien qui n'appartienne à des peuples encore grossiers." [137] The cults of Jupiter, Neptune, Mercury, Bacchus, Ceres, etc. were all introduced from Asia.[138] Bailly examines in some detail the practices of the oldest Greek festivals [139] and finds that they have in common the character of fertility rites. Of later origin were the more abstract cults of Apollo and Diana (the sun and the moon) which came into Greece from the land of the Hyperboreans beyond the Black Sea via Delos.[140] The legend of Jason and the Argonauts is interpreted as the history of a naval and military expedition against these same Hyperboreans, an expedition the prize of which was no ram's fleece, but loot.[141] As all wars, however, have some cultural aspects, the Argonaut expedition had the effect of bringing Greeks directly into contact with the sun and moon cults with which they were familiar through Delos.[142] The essential of this argument is the simplicity of Greek religion. "Je suis persuadé que la Grèce n'eut d'abord qu'un petit nombre de dieux. Chacun d'eux réunissait plusieurs départements; on leur attribuait beaucoup d'affaires différentes." [143]

Perhaps Bailly's *Essai sur les fables* would have ended here, if it had not been at the mercy of Cubières. What follows appears to be the connecting link with the proposed history of religions. As a matter of fact Bailly says in connection with the influence of oriental philosophy on the primitive Greeks, "J'éclaircirai davantage ces difficultés lorsque j'examinerai l'essence et le culte de chaque divinité." [144] Beginning with the fourteenth chapter, Bailly turns to a study of "l'es-

[127] *Ibid.* **1**: 29, 32–33.
[128] *Ibid.* **1**: 19.
[129] *Ibid.* **1**: 36 ff.
[130] *Ibid.* **1**: 40 ff.
[131] *Ibid.* **1**: 56.
[132] *Ibid.* **1**: 81.
[133] *Ibid.* **1**: 117
[134] *Ibid.* **1**: 136–137.
[135] *Ibid.* **1**: 136.
[136] *Ibid.* **1**: 177. (He dates its introduction to the year 1982 B.C.)
[137] *Ibid.* **1**: 162.
[138] *Ibid.* **1**: 164–222.
[139] The oldest are, according to Bailly, those of Minerva, Bacchus, Ceres and Pan.
[140] FABLES **1**: 269–302 and **2**: 1–78.
[141] *Ibid.* **2**: 92–104.
[142] *Ibid.* **2**: 117.
[143] *Ibid.* **1**: 276.
[144] *Ibid.* **2**: 161.

sence," and here it may be possible to see traces of Masonic philosophy.

Bailly is convinced of the historicity of Orpheus, whom he regards as a great poet and musician, philosopher and theologian, who preached a doctrine of virtue with rewards for the just and punishment for sinners, who was martyred for his teachings by the Bacchantes, and deified by his disciples. The parallel with the history of Christ is quite clear. Of the doubts expressed on the existence of Orpheus, Bailly says, "J'aimerais autant croire que Mahomet n'a jamais existé." [145] When Orpheus arrived on the scene, Greek religion was divided between two accepted cults: those which had to do with fertility rites and those which revered the sun and the moon and the heavens. Orpheus was the reformer who purified the practices of religion among the people and introduced the mysteries (i.e. the philosophic elements) of religion to the intellectuals.[146] The mysteries, which Orpheus had learned in Asia and Egypt, involved chiefly a belief in monotheism, the after life, and the efficacy of virtue:

> Fermez les portes, éloignez les profanes, je vais révéler les mystères à ceux qui peuvent les entendre. Ecoute, Musée, fils de Sélène, je ne dirai que la vérité. Dépouille-toi des préjugés, écarte le souvenir des plaisirs qui pourraient obscurcir ces clartés. C'est la parole divine que tu vas entendre. Règle ton esprit et ton cœur, marche dans les voies de la justice et connais un dieu maître de l'univers. Unique et né de lui-même, toutes choses sont engendrées par lui. Partout il est présent et agissant. Il est invisible, mais il voit tout. . . . Ne diffère point; ne te flatte pas de tromper la divinité; change de conduite et hâte-toi de fléchir l'Eternel.[147]

The single deity, Orpheus taught, was the progenitor of all the minor gods, and they, in turn, were but the various manifestations of the true god. It was this truth which constituted the mystery. Bailly affirms that Orpheus taught also the resurrection of the body and the immortality of the soul. These teachings gave rise to "la vie orphique" which was a virtuous way of life based upon abstinence and discipline, by which the initiate would achieve eternal life. The mystic and Masonic elements are strong when Bailly writes:

> . . . la vie orphique a été longtemps celle des sages, et si elle n'a pas subsisté toujours, c'est que la vertu est comme le bonheur; il est difficile de la rencontrer; il est plus difficile encore de s'y fixer. Le peu d'individus qui ont su les saisir en jouissent dans le silence. Ces deux états désirables n'ont rien d'imposant pour la multitude qui s'égare dans les songes et se fatigue après des chimères.[148]

Bailly does not say in so many words that he subscribes to the principles of the orphic life, but the implication is there, and the fact that it is restricted to an elite circle of the wise sets it apart from the Catholic tenets of revealed religion.

[145] *Ibid.* **2**: 138.

[146] *Ibid.* **2**: 163.

[147] *Ibid.* **2**: 164. (Bailly is quoting from Clement of Alexandria, *Hortatory to the Greeks.*)

[148] *Ibid.* **2**: 238.

The last three chapters contain a discussion of the *Theogony* of Hesiod, which Bailly is unwilling to take in a completely allegorical sense. His judgment of this work is not unlike the modern critics' view of the Old Testament—"un peu de physique et beaucoup d'histoires." [149] He divided the *Theogony* into three parts. The first, from the origin of all things to the reign of Saturn, is largely an allegory of natural phenomena, but includes a hazy tradition of the first men and of migrations in remote times. The second, the reign of Saturn, is the account of an historical epoch.[150] The third, dealing with the illicit relations of Jupiter with mortal women and the birth of the minor gods, is of strictly Greek origin and is designed to reconcile ancient religious traditions with cults recently introduced.

The *Essai sur les fables* breaks off without any conclusion and without any hint of what was to come next. When the work was ultimately published it was criticized severely by Delisle de Sales. Two of Bailly's apologists adopted diametrically opposed arguments in defending the work. Baudin des Ardennes said in a session of the Corps Législatif:

> Ne craignez pas que ce soit ici l'une de ces productions seulement ébauchées que leur auteur eût lui-même condamnées à l'oubli. Une copie mise au net, indépendamment du premier manuscrit, sur lequel on voit les corrections, annonce assez que l'ouvrage avait subi les épreuves nécessaires pour être digne de voir le jour.[151]

Cubières wrote: ". . . peut-être ne faut-il pas condamner un tableau dont on n'a vu encore que l'esquisse." [152]

"Esquisse" or otherwise, the *Essai sur les fables* is a significant work in the development of Bailly's ideas. It continues the retreat from the historically untenable position which Bailly had adopted in the ancient astronomy and the first volume of letters to Voltaire. It shows a much more mature approach to the complex problem of the historical and philosophical value of myth. And it gives us what may well be Bailly's profession of faith in the principle of Freemasonry. This work is also significant for the complete absence of astronomical evidence. With one exception, Bailly had now abandoned the field of the history of science and, without exception, the practice of observation.

On May 21, 1783, Bailly was elected to the Academy of Sciences at Haarlem,[153] and it was beginning to look as though the prophet were indeed not without honor save in his own country. But on October 29, d'Alembert died, and the way into the Académie Française seemed open. Mérard de Saint-Just says that Bailly even started work on an *éloge* of d'Alembert.[154] Be

[149] *Ibid.* **2**: 319.

[150] Bailly still calls it the golden age, but the greatest achievement which he attributes to it here is the invention of agriculture.

[151] Baudin des Ardennes, *Discours*, 6.

[152] *Recueil*, xlviii.

[153] Hollandsche Maatschappij der Wetenschappen, Haarlem, *Verhandelingen* **21** (1784): xliv, and *Notice historique*, x.

[154] *Op. cit.*, 59.

that as it may, two days later the Comte de Tressan died, and when, in November, the Academy voted on the successors to d'Alembert and Tressan, the d'Alembert cabal had the dubious satisfaction of electing Choiseul-Gouffier to replace d'Alembert, giving Bailly the equally dubious pleasure of having to write the *éloge* of his arch enemy Tressan.[155]

On Thursday, February 26, 1784, the Academy held a double reception ceremony for its two new members.[156] Whether from curiosity or from genuine interest, the throng that gathered for this public meeting was the most brilliant and the most numerous that the Academy had ever seen—and apparently the noisiest. The candidates were agreed in omitting the stereotyped formulae of such occasions, and neither one made mention of Cardinal Richelieu, Louis XIV or Louis XV. Choiseul-Gouffier, as Bailly's senior (because d'Alembert had died before Tressan), spoke first. His was the customary *éloge,* and the only thing that livened it up was the unexpected public airing of d'Alembert's illegitimacy. Condorcet, who, as Directeur, received the new members, replied with a few appropriate words about his deceased patron and a lengthy counsel to Choiseul-Gouffier on his recent appointment as ambassador to the Ottoman Empire, which both Meister and Bachaumont regard as in poor taste—"brillantes absurdités" are Bachaumont's words.

Bailly had rather less to work with in speaking of Tressan, but he did a better job than his colleague:

> Il y a moins de naturel, moins de simplicité dans le discours de M. Bailly que dans celui de M. de Choiseul; mais on y trouve aussi plus d'idées, plus de finesse et de profondeur. La manière dont il caractérise l'esprit et le talent qui distinguent les ouvrages du comte de Tressan respire toutes les grâces du modèle qu'il avait à peindre.[157]

The main burden of Bailly's remarks about Tressan was the Buffonian notion that the writer reveals his character in his style—an idea which Bachaumont dismisses as "souvent démentie par les faits."

The really novel aspect of Bailly's speech, however, was his insistence on the importance of science to letters. He seized upon the examples of Fontenelle and Voltaire, d'Alembert and Tressan, Condorcet and himself as "académiciens doubles" [158] to suggest that "désormais on ne serait point grand littérateur sans être en même temps mécanicien, astronome, géometre." [159]

> Ce que les sciences peuvent ajouter aux privilèges de l'espèce humaine n'a jamais été plus marqué qu'au moment où je parle. Elles ont acquis de nouveaux domaines à l'homme; les airs semblent lui devenir accessibles comme les mers, et l'audace de ses courses égale presque l'audace de sa pensée. Le nom de Montgolfier,[160] ceux des hardis navigateurs de ce nouvel élément, vivront dans les âges. Mais qui de nous, au spectacle de ces superbes expériences, n'a pas senti son âme s'élever, ses idées s'étendre, son esprit s'agrandir? Cette impression est le sentiment d'une nouvelle force que l'esprit humain a reçue; il la tient de l'effort et de l'élan même de l'invention, et cette force sera transmise à ceux qui dans leurs écrits célébreront ces merveilles. . . .[161]

Convinced of the validity of his idea, it was only natural that Bailly should look upon his entry into the ranks of the immortals as a natural step in the path of Fontenelle and Voltaire. The whole speech is therefore a little wanting in the humility which becomes a novice: ". . . Pénétré de l'honneur que vous me faites, je pense que votre choix m'en a déclaré digne. . . ." [162] It is not possible to say what effect this pronouncement had on the other members of the Academy, but the critics seem to have forgiven Bailly his touch of vanity. Bachaumont concludes: "Quoi qu'il en soit, au ridicule près de ce paradoxe d'un amour-propre trop exalté, que M. Bailly a pourtant soutenu avec esprit et vraisemblance, son discours est excellent." [163]

The general tone of Condorcet's reply we have already noted.[164] Bachaumont says more explicitly that he qualified Bailly as "courtisan sage," "littérateur exquis" and "homme aimable de société," none of which may be regarded as very high compliments. At the end of his speech, however, he took up Bailly's argument for the "académicien double" and seemed "disposé à se fâcher sérieusement contre quiconque ne serait pas de son avis et oserait le contredire." [165]

Membership in the Académie Française has been variously regarded as a mark of distinction and the kiss of death, but the respectability of it has never been questioned. For Jean-Sylvain Bailly there can be no doubt that it was the fulfillment of a longstanding ambition to become a catholic man, accepted in the world of letters as in the world of sciences and somehow drawing the two together. This was, in a larger sense, one aspect of his devotion to the unity of truth and the accessibility of knowledge. For nearly ten years he had dedicated himself to the popularization of scientific inquiry, to the proposition that all men might profit by learning. If his Masonic training or researches into the mysteries of antiquity had suggested to him that there was one truth for the initiate and one truth for the plebeian, these were differences of degree, not order. Furthermore, he had not publicly given out any such ideas. His election to the Academy must have signified to him a confirmation of his creed and a measure of his success.

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[155] Bachaumont, December 12, 1783.

[156] Full accounts of the event are given in Bachaumont, February 26, 1784; *L'Année littéraire* 1784, **5**: 239–256; and Grimm, February, 1784.

[157] Grimm **13**: 491.

[158] *L'Année littéraire* 1784, **5**: 246.

[159] Bachaumont, February 26, 1784.

[160] This passage may have been extemporaneous, for Bachaumont says, "M. de Montgolfier, dont on parle tant aujourd'hui, était à cette séance; il a été claqué à toute outrance dès que le public l'a déterré dans la foule; on l'a fait asseoir aux places destinées aux membres des deux Académies des Sciences et des Belles-Lettres; M. Bailly l'a célébré dans son discours, et il a été de nouveau exposé aux regards, à l'admiration et aux applaudissements de l'asseemblée."

[161] DISC MEM **2**: 386–387.

[162] *Ibid.* **2**: 375–376.

[163] *Loc. cit.*

[164] See *supra,* p. 474.

[165] *Loc. cit.*

VI. ANIMAL MAGNETISM

Mesmer, Deslon, the Royal Commission on animal magnetism, Bailly's letter on imagination among animals

> L'homme se souvient, imagine, invente, pour ainsi dire, quand il lui plaît; il n'a qu'à vouloir. . . . On voit qu'il a reçu le droit de commander à la nature.
>
> Bailly, "Lettre à M. Leroy, 23 septembre 1784."

Many eighteenth-century men called themselves *philosophes* because they had read Voltaire and because they rejected the principles of revealed religion. Yet they were not skeptics; they crowded the doorsteps of Mesmer, Cagliostro, and many a lesser charlatan. Chénier, in his "Epitre sur la superstition," has described the type:

> Un jeune homme orgueilleux et docte réputé,
> Tout plein de quelque auteur au hasard feuilleté,
> Etonne un cercle entier de sa haute sagesse.
> Il se joue avec grâce aux dépens de la messe;
> Il plaisante le pape et siffle avec dédain
> Tous ces rêves sacrés qu'enfanta le Jourdain.
> Et puis d'un ton d'apôtre empesé, fanatique,
> Il prêche les vertus du baquet magnétique,
> Et ces doigts qui de loin savent bien vous toucher
> Et font signe à la mort de n'oser approcher.[1]

The particular "superstition" to which Chénier has reference here is mesmerism or, as it was then called, animal magnetism. The year 1784 was a critical one in the uneven history of mesmerism. For the first time, Mesmer's theories and practices were called to the attention of the world at large, and for the first time a scientific attempt was made to evaluate Mesmer's claimed discoveries. The examination of animal magnetism was the work of a royal commission in which Bailly played an important role.

Bailly's life may be described in terms of the dual attraction of skepticism and credulity. These were two poles between which his thinking fluctuated. Sometimes, as in the *Eloge de Leibnitz,* he was attracted by skepticism. Sometimes, as in the *Histoire de l'astronomie ancienne* and the letters to Voltaire, under the influence of Court de Gébelin, he was repelled by it. To Voltaire he wrote, "Le doute doit avoir des bornes; toutes les vérités ne peuvent pas être démontrées comme les vérités mathématiques."[2] But Bailly had in him nothing of the "jeune homme orgueilleux et docte réputé"; he knew how to doubt when reason demanded it. Participation in the official investigation of mesmerism enabled him to dispel the illusion that he was a *frère illuminé,* Condorcet to the contrary notwithstanding.

We must digress briefly at this point to examine the background of that investigation and to realize the factors which made it an affair of considerable public interest.[3] Mesmer[4] was a wealthy Viennese physician who had made several false starts in preparation for a church career and the legal profession. When he took his degree at the University of Vienna he submitted to the Faculty of Medicine a doctoral dissertation entitled *De influxu planetarium in corpus humanum* (1765) in which he maintained that there was an invisible universal fluid which inhabited all matter and served as a means of communication and harmony between planets and between persons and objects. This doctrine was not taken very seriously, and for ten years or so Mesmer conducted an orthodox practice in Vienna, where he was socially prominent, enjoyed the privileges of the court and maintained an artistic and cultural salon.[5] About 1775 Mesmer revived the notions of his doctoral thesis and put forth the idea that disease—at least nervous (functional) disorder—was the result of improper distribution of this mysterious fluid. In his *Schreiben an einen auswärtigen Arzt*[6] he used the expression "animal magnetism" for the first time, and likened it to terrestrial magnetism. Mesmer seems to have toyed with the notion that this fluid was related to electricity, but he did not pursue this line of thought. About the same time, he took up experiments with Father Hell[7] who had revived Paracelsus' use of magnets to produce an artificial ebb and flow through the body. At first Mesmer used real metal magnets, but, ultimately arguing that all matter had magnetic quality, he employed wood, water, cloth, glass, etc. as well. His famous *baquet* was a wooden tub filled with powdered iron or glass and water which Mesmer had "magnetized" with his hands, covered with a wooden lid through which projected iron pipes or rods which

[1] *Œuvres* **3**: 196.

[2] ATLAN, 6, note *b*.

[3] For an early account of animal magnetism see Kurt Sprengel, *Histoire de la médecine depuis son origine jusqu'au 19e siècle, traduit de l'allemand sur la seconde édition par A. J. L. Jourdan* **6**, Section seizième, chapt. IV "Thaumaturgie médicale," 93–116, Paris, Deterville et Desoer, 1815.

[4] Franz or Friedrich Anton Mesmer (1733 or 1734–1815). The biographical details are taken from Gilbert Frankau, Introductory Monograph to *Mesmerism by Doctor Mesmer . . .*, London, Macdonald, 1948; Goldsmith, *Franz Anton Mesmer, the history of an idea,* London, Barker, 1934, and Zweig, *Mental healers,* New York, Viking, 1932.

[5] Mesmer was passionately fond of music; Mozart found in him one of his first friends and protectors.

[6] Written in 1775 to Dr. Johann Christ of Hamburg.

[7] Maximilian Hell (1720–1792), Hungarian astronomer, Jesuit priest, professor at the University of Vienna, and court astrologer to Maria Theresa.

the patients held in their hands. The purpose of the magnetic treatment was to produce a crisis in the patient's nervous system in order to inject or expel the magnetic fluid as necessary. Mesmer became increasingly aware that he could not cure organic disease and that he could not, in any event, cure a functional disorder unless he had the patient's full cooperation. He insisted more and more on the *rapport* between the doctor and the patient and increasingly abandoned mechanical devices in favor of the laying on of hands or even hypnotic passes in which there was no physical contact. Mesmer had unwittingly discovered the powers of transference and suggestion.

A professional scandal in connection with his treatment of Maria Theresa von Paradis, a brilliant young blind pianist whose sight Mesmer temporarily restored, obliged Mesmer to leave Vienna, and in February 1778 he came to Paris. Paris was receptive to any novelty, and Mesmer had no difficulty in establishing a large practice immediately. He was less successful, however, in winning adherents among his professional colleagues. Through the composer Gluck, whom he had known in Vienna, he met Leroy,[8] President of the Academy of Sciences. Leroy tried vainly to interest the Academy in Mesmer's discovery and even arranged for the academicians to attend a demonstration at Mesmer's house at Creteuil in May of 1778. The Academy was most likely more occupied with Voltaire and Franklin than with Mesmer; in any case Mesmer won no official recognition. In the autumn he found an ally in Dr. Deslon [9] who repeated in the Faculty of Medicine the same manœuvres which Leroy had tried in the Academy of Sciences. Deslon was even less successful and risked being expelled from his profession. Meanwhile Mesmer was at work on an apology of his system of treatment, the *Mémoire sur la découverte du magnétisme animal,* which appeared in Paris and Geneva in 1779. The twenty-seven propositions in which he summed up his theory were so vague and so ill expressed that Deslon hastened to put a gloss on his master's explanation with his *Observations sur le magnétisme animal,* published the following year. Deslon wrote better French than Mesmer, but his arguments were not much clearer: "De même qu'il n'y a qu'une nature, qu'une vie, qu'une santé, il n'y a selon M. Mesmer qu'une maladie, qu'un remède, qu'une guérison." [10]

[8] Jean-Baptiste Leroy (d. 1800), one of four famous sons of a famous father, was himself a physicist who had for some years been interested in the therapeutic value of electricity. He was the author of a *Mémoire sur l'électricité,* 1753, and a *Mémoire . . . des tentatives faites pour guérir plusieurs maladies par l'électricité,* 1760. Leroy, as director of the Cabinet de Physique du Roi, succeeding the abbé Noël, conducted various electrical experiments at La Muette with Franklin. He was a neighbor of Bailly, occupying an apartment in the same gallery of the Louvre.

[9] Charles Deslon (d. 1786), physician to the Comte d'Artois.

[10] *Op. cit.,* 33.

Despite the hostility of medical and academic circles, Mesmer won a large following during his first three years in Paris. Through Deslon he had access to court circles and won the support of the Queen, the Princesse de Lamballe, the Prince de Condé, the Duc de Bourbon, and other important persons. Writers disagree on the score of Mesmer's disinterestedness. It is certain that many of his patients were poor and were treated free of charge. On the other hand he charged exorbitant fees among the well-to-do. Undoubtedly, however, Mesmer considered recognition more important than money. Marie-Antoinette wished the government to subsidize him, and the court did in fact offer him a large grant.[11] Probably through the King's intervention, a condition was placed on this generosity: Mesmer was to take in three assistants appointed by the state to whom he should demonstrate the usefulness of magnetism. This condition Mesmer refused to accept, and in May 1781 he retired to Spa, having delivered what amounts to an ultimatum: if he could not obtain generous and unconditional support in France, he would take his talents elsewhere.

While at Spa, Mesmer started work on an *Histoire abrégée du magnétisme animal* (1783), but his self-imposed exilê did not last long. In his absence, his disciples and patients were busy raising a private subscription which produced 400,000 livres for the continuation of his work. This drive was organized by an influential Paris lawyer, Bergasse,[12] who also set up a magnetism club called the Société d'Harmonie, fashioned after the Masonic lodges. Mesmer, pleased with this show of affection and annoyed that Deslon had continued to give magnetic treatments in his absence, returned to Paris to set up shop in the Place Vendôme and, shortly after, at the Hôtel Bouillon in the rue Montmartre. In these two establishments, in darkened rooms, amid soft music and hushed voices, Mesmer, dressed in lilac robes and waving an iron wand, hovered over his patients and the mysterious *baquet* for nearly five years.[13] Zweig suggests the popularity of the treatment when he writes, "It was like a first night at the opera." [14]

Mesmer and Deslon working together and separately effected a number of cures (psychogenic rather than biogenic), but many of their patients were simply hypochondriacs and neurotics. As might be expected,

[11] Arago 2: 201, and Zweig, 49, say 20,000 livres for research and 10,000 livres for subsistence. Frankau, 17, says the 10,000 livres were for the establishment of a school. Goldsmith, 121, claims the grant amounted to 40,000 livres.

[12] Nicolas Bergasse (1750–1832) won his reputation in the Kornmann affair (1787–1789). Beaumarchais portrayed him in *La Mère coupable* under the name of Begears. Deputy to the Estates General in 1789, he was later imprisoned for royalist leanings. Bergasse was the author of several legal works written during the Revolution and after the Restoration.

[13] Although in disrepute after 1784, Mesmer remained in Paris until 1792.

[14] *Op. cit.,* 53.

gossip soon began to suggest that the private "salles de crises" where doctor and patient met alone were sources of licentiousness. Moreover, Mesmer's person was beginning to acquire magical qualities, and he was mobbed in the streets by persons who simply wanted to touch him. Mesmer may have been an honest man, but his conduct did nothing to allay this fanatical attitude. Soon Paris was divided between pro- and anti-Mesmerites, as it had been previously between Voltaireans and Rousseauists or Gluckists and Piccinists. It is possible that the quarrel extended even to the royal family where the Queen favored the divine German whom the King regarded as a potential troublemaker.

On March 12, 1784, the King acted to quiet the magnetic storm. Four doctors of the Paris Faculty, MM. Borie, Sallin,[15] d'Arcet,[16] and Guillotin,[17] were named to inquire into animal magnetism as practiced by Deslon. At the request of the doctors, six members of the Academy of Sciences were chosen to work with them: Franklin, Leroy, Bailly, de Bory,[18] Lavoisier,[19] and Jussieu.[20] No official reason was given for choosing Deslon instead of Mesmer, but it is clear that he was most anxious to cooperate and was certain that he could convince the commission of the existence of animal magnetism. Mesmer had not shown such docility. As Deslon claimed to follow Mesmer's system faithfully, it made very little difference from the royal point of view which one was discredited, for it cannot be doubted that such was the purpose of the inquiry.

Whatever the King's intent, the composition of the commission left room for some uncertainty about what their findings would be. Franklin, as a foreigner, could afford to be independent, and his experiments with electricity might have led him to see something in magnetism. Leroy had been one of Mesmer's first supporters in Paris. On first consideration, one might have imagined that Bailly would be disposed in favor of animal magnetism. Here was the concept of universal harmony, the simple solution of complex phenomena, the reconciliation of earthly and celestial forces, which he had been seeking. His mentor, Court de Gébelin, had embraced animal magnetism as the catholicon which was to "rétablir l'harmonie primitive qui régnait entre l'homme et l'univers." [21] The fact that one member of the group, Jussieu, did publish a dissenting opinion is fair proof that they were allowed to operate with complete freedom.

It has been argued that the commission's investigation was too materialistic.[22] One can scarcely see how it could have been otherwise. The commission was appointed to establish the accuracy of Mesmer's claim that there existed:

> un fluide universellement répandu . . . le moyen d'une influence mutuelle entre les corps célestes, la terre et les corps animés . . . continué de manière à ne souffrir aucun vide . . . capable de recevoir, propager, communiquer toutes les impressions du mouvement . . . réfléchi par les glaces . . . communiqué, propagé, augmenté par le son. . . . [23]

These expressions sound sufficiently material to warrant the attention of a chemist, a physicist, a botanist, an astronomer, etc. They were seeking something which its discoverer claimed had a physical existence. They had no means or authority to proceed by other than physical experiment.

The work of the commission was slow in getting under way. On Saturday, May 8, the members met at Franklin's house in Passy to discuss plans. The following day they met with Deslon and the Lieutenant-General of Police at Deslon's house.

> M. Deslon s'est engagé avec les commissaires 1°, à constater l'existence du magnétisme animal; 2°, à communiquer ses connaissances sur cette découverte; 3°, à prouver l'utilité de cette découverte et du magnétisme animal dans la cure des maladies.[24]

Deslon first explained to the commission the nature and purpose of his equipment—the *baquet,* the iron rods, the pianoforte, etc. The commissioners assured themselves by the use of an electrometer and a non-magnetized needle that none of this equipment was electrified or magnetized or in any other way possessed

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[15] Borie died at the outset of the investigation and was replaced by Majault, also of the Faculty of Medicine. Neither Borie nor Sallin nor Majault is identified in Hirsch, *Biographisches Lexicon der Hervorragenden Aerzte aller Zeiten und Völker,* 4 v., Vienna and Leipzig, Urban and Schwarzenberg, 1884; Jourdan, *Dictionnaire des sciences médicales: Biographie médicale,* 7 v., Paris, Panckoucke, 1820; Dezeimeris, *Dictionnaire historique de la médecine ancienne et moderne,* 7 v., Paris, Béchet, 1828.

[16] Jean d'Arcet or Darcet (1725–1801), chemist and professor at the Collège de France, served also as director of the porcelain factory as Sèvres, Inspector General of the Mint, and Inspector of the Gobelins factory.

[17] Joseph-Ignace Guillotin (1738–1814) for whom the guillotine is named. As deputy to the Estates General in 1789, he pleaded for the adoption of decapitation as the sole humane form of capital punishment. It will be remembered that Guillotin was one of the early members of the Loge des Neuf Sœurs.

[18] Probably Gabriel de Bory. See *supra,* p. 448.

[19] Antoine-Laurent Lavoisier (1743–1794), the famous chemist. Like Bailly, Lavoisier died during the Terror.

[20] Antoine-Laurent Jussieu (1748–1836), professor of botany at the Jardin des Plantes and founder of the Muséum d'Histoire Naturelle. Jussieu disagreed with the findings of his colleagues and published a minority report entitled *Rapport de l'un des commissaires chargés par le roi de l'examen du magnétisme animal.*

[21] *Lettre de l'auteur du Monde primitif à messieurs ses souscripteurs sur le magnétisme animal,* 42, Paris, Valleyre, 1784, quoted in Viatte, **1**: 223. A few weeks after this ardent defense of mesmerism, Court de Gébelin died while being magnetized.

[22] Goldsmith, 137.

[23] *Mémoire sur la découverte du magnétisme animal,* 74 ff., and DISC MEM **2**: 2.

[24] DISC MEM **2**: 4.

of unusual physical properties. As Deslon claimed to have abandoned the private *salle de crises*—perhaps to allay malicious gossip—the commissioners made their first acquaintance with magnetic therapy in the semi-public gatherings where a number of patients sat around the *baquet* and somewhat indelicately suffered their convulsions to be witnessed by all. From these first observations the investigators were able to draw some general conclusions. There was no denying that the emotional and physical crises took place. "On ne peut s'empêcher de reconnaître, à ces effets constants, une grande puissance qui agite les malades, les maîtrise, et dont celui qui magnétise semble être le dépositaire." [25] They noticed, moreover, that the crises were more pronounced among women than among men and that they were induced less by the magnetizer's gesticulations than by the laying on of hands particularly in the hypochondriac region and about the abdomen. Of the magnetic fluid itself, they concluded:

> . . . ce fluide échappe à tous les sens. Il n'est point lumineux et visible comme l'électricité; son action ne se manifeste pas à la vue, comme l'attraction de l'aimant; il est sans goût et sans odeur; il marche sans bruit et vous entoure et vous pénètre sans que le tact vous avertisse de sa présence. S'il existe en nous et autour de nous c'est donc d'une manière absolument insensible.[26]

Conceding that "le magnétisme animal peut bien exister sans être utile," the commissioners observed that "il ne peut être utile s'il n'existe pas." [27] The problem was to isolate and identify a completely intangible element by its effects alone.

Although Mesmer and Deslon claimed permanent cure through long treatment, the commissioners doubted that such a cure could be regarded as proof of the existence of the magnetic fluid. Nature, they said, is the best cure, and it is the purpose of the medical profession to assist nature by removing impediments to natural processes. Many illnesses cure themselves or cures may be effected in different patients by different and disputed forms of treatment.

> Or, comment s'assurer, par le traitement des maladies, de l'action d'un agent dont l'existence est contestée, lorsqu' on peut douter de l'effet des médicaments dont l'existence n'est pas un problème? [28]
>
> Si le magnétisme était sans action, les malades soumis à ses procédés seraient comme abandonnés à la nature. Il serait absurde de choisir, pour constater l'existence de cet agent, un moyen qui, en lui attribuant toutes les cures de la nature, tendrait à prouver qu'il a une action utile et curative, lors même qu'il n'en aurait aucune.[29]

This being the case, the commissioners turned to controlled experiments:

> . . . aux preuves purement physiques, c'est-à-dire aux effets momentanés du fluide sur le corps animal, en dépouillant ces effets de toutes les illusions qui peuvent s'y mêler, et en assurant qu'ils ne peuvent être dus à aucune autre cause que le magnétisme animal.[30]

Abandoning Deslon's public treatments where the number of patients made scientific conditions impossible and where the essentially private business of the patient made inquiry indiscreet, the commissioners proceeded to a series of sixteen different types of experiment designed to cover every aspect of animal magnetism.

First they submitted themselves to the treatment. For this purpose Deslon set aside a separate room and *baquet* to which they repaired once a week for a two and a half hour session. Later, believing that there might by efficacy in uninterrupted treatment, they agreed to be magnetized for three days in a row. Other than fatigue, "agacement dans les nerfs" and one case of stomach disorder resulting from the application of too much pressure, none of the group experienced any sensation. Franklin and his entire household at Passy consented to be magnetized by Deslon who made several visits for that purpose, but without any more striking results.

Turning then to persons who were really ill, the commissioners witnessed the magnetism of eleven patients, seven of whom were "de la classe du peuple" and the other four, persons of quality. Their maladies ran the gamut of the medical catalogue, including scrofula, asthma, convulsions, tumors, "obstructions," nervousness and shock induced by the kick of a cow. Only five of these persons experienced any sensation upon being magnetized, and only three of these reactions could be ascribed with any certainty to the treatment itself. These three occurred among the "classe du peuple," who had been led into the presence of a learned group, told that they were to undergo an unusual medical treatment, and paid for their services. It seemed reasonable to suppose that these patients might feel under some sort of obligation to say that they had experienced one sensation or another, being literally paid for their pains. It was noted that neither of the two children magnetized had any reaction, perhaps because they did not feel this obligation. These experiments led the commissioners to conclude:

> . . . que le magnétisme a semblé être nul pour ceux des malades qui s'y sont soumis avec quelque incrédulité . . . que ces impressions, en les supposant toutes réelles, étaient la suite d'une persuasion anticipée et pouvaient être un effet de l'imagination.[31]

Following this line of thought, the next ten experiments were calculated to determine the role of the imagination in magnetism. Three sessions were held with Dr. Jumelin, Dean of the Faculty of Medicine, who achieved the same results as Mesmer and Deslon by an entirely different method. Whereas the latter maintained a distinction of magnetic "poles," Jumelin

[25] *Ibid.* **2**: 9.
[26] *Ibid.* **2**: 12.
[27] *Ibid.* **2**: 11.
[28] *Ibid.* **2**: 17.
[29] *Ibid.* **2**: 19.
[30] *Ibid.* **2**: 20.
[31] *Ibid.* **2**: 36.

did not. Another physical aspect of magnetism was thus ruled out. By magnetizing the same patients with and without blindfolds, it was determined that sight and sound played a more important part than hypnotic passes or the use of magnetized materials. The use of suggestion by leading questions was also found to be most effective. "Au lieu de diriger sur eux le magnétisme, on ne faisait que monter et diriger leur imagination." [32]

Satisfied that Jumelin's treatments had confirmed their views on imagination, the commissioners returned to Passy to demonstrate the technique to Franklin. According to the teaching of Mesmer, any magnetized object should exert an influence on a person coming into contact with it, providing that the person was sensitive to magnetism to begin with. Deslon agreed to magnetize a tree in Franklin's garden and bring along a twelve-year-old lad who was "fort sensible" to pick it out. The boy was blindfolded and led about the garden to four non-magnetized trees; at the first he began to sweat; at the second he complained of pains in his head; at the third he became very dizzy; and at the fourth he fell into convulsions, lost consciousness, and had to be revived. Deslon tried to explain this accident by the theory that all objects, after all, had magnetic properties, which in this case were reinforced by his presence. The commission observed a little tartly, "Mais alors une personne sensible au magnétisme ne pourrait hasarder d'aller dans le jardin sans risquer d'avoir des convulsions," [33] and suggested instead that "le jeune homme savait qu'on le menait à l'arbre magnétisé; son imagination s'est frappée, successivement exaltée et au quatrième arbre elle a été montée au degré nécessaire pour produire la crise."[34] Similar experiments were carried out on other persons, and in all cases it was possible to induce crises without recourse to magnetism simply by making the patient believe that he was magnetized. The most amusing of these was the session held at Lavoisier's apartment at the Arsenal, where Deslon magnetized a cup of water which the patient was to choose from a series of non-magnetized cups. The subject was, in fact, presented with only the non-magnetized cups. She chose one, fell into convulsions and, when she had recovered and asked for a drink of water, accepted the one magnetized by Deslon with complete equanimity.

The commission was now certain of the power of imagination without the intervention of magnetism. It remained to be seen what effect magnetism would have when the imagination was not at work. The last experiments were designed to answer this query. A young working girl who had shown marked sensitivity to magnetism was magnetized continuously for a half-hour through a paper screen simulating a door. Meanwhile she was engaged in conversation on the other side of the door, chattered gaily and seemed in the best of health and spirits. When, a few minutes later, she was asked to submit to a treatment, she obliged with convulsions even though the magnetizer avoided the gesticulations which were supposed to produce the crisis.

Altogether the commissioners experimented on some forty persons, excluding themselves and the patients observed at public treatments. They conscientiously chose from all ages, walks of life and states of health. The treatments were conducted by Deslon according to Mesmer's principles, by Jumelin according to his own system, by the medical members of the commission who varied the procedure to suit the experiment. The commissioners entered into the most minute details and recorded conclusions favorable as well as unfavorable to magnetism. " . . . ils les disent parce qu'ils se sont imposé la loi de dire toujours et sur toute chose la vérité." [35] This scrupulous examination of the facts brought them to a twofold conclusion. The crises claimed by animal magnetizers were real, but they were not the result of animal magnetism: "Cet agent, ce fluide n'existe pas." [36]

The effects achieved were the result of imagination frequently stimulated or augmented by sense perceptions, especially the touch. The commission noted that the touch was most effective about the belly and hypochondriac regions which constitute "un véritable centre nerveux, au moyen duquel, abstraction faite de tout système, il existe très certainement une sympathie, une communication, une correspondance entre toutes les parties du corps." [37] In general, the effects of magnetism were ascribed to the disturbance of the functions of the diaphragm, either by direct physical contact or by the power of the imagination.[38]

The commissioners also noted what they regarded as the dangerous aspect of imitation and mass hysteria in the public treatments where a crisis in one patient set off a series of reactions in the others. They felt that the convulsions which were the chief objective of magnetism were more harmful than salubrious, particularly as they tended to become habitual among the devotees of the *baquet*. This objection was elaborated in a secret report, withheld from publication in 1784,[39] wherein it was suggested that the mass hysteria might be touched off by a fake crisis staged expressly for that purpose. Also withheld from publication was the commissioners' conclusion relative to the morality of

[32] *Ibid.* **2**: 41.
[33] *Ibid.* **2**: 50.
[34] *Ibid.* **2**: 51.
[35] *Ibid.* **2**: 24–25.
[36] *Ibid.* **2**: 79.
[37] *Ibid.* **2**: 69. *Cf.* La Mettrie, *L'Homme machine:* " . . . l'imagination se bouche avec les viscères; et de là naissent tous ces singuliers phénomènes de l'affection hystérique et hypocondriaque."
[38] *Ibid.* **2**: 71.
[39] The "Rapport secret sur le magnétisme" was not published until 1800. It is to be found in François de Neufchâteau, *Le Conservateur* **1**: 146–155, Paris, Crapelet, An VIII.

magnetism. At their first meeting with Deslon on May 9, M. Lenoir had put the question squarely to Deslon: "Je vous demande, en qualité de Lieutenant général de Police, si, lorsqu'une femme est magnétisée et en crise, il ne serait pas facile d'en abuser?" Deslon had replied in the affirmative.[40] Although no doubts were expressed about the integrity of Deslon, Mesmer, Jumelin, or any other practitioner, the commission felt that magnetic treatments were likely to exceed the limits of propriety.

> Ce sont toujours des hommes qui magnétisent les femmes; les relations alors établies ne sont sans doute que celles d'un malade à l'égard de son médecin, mais ce médecin est un homme; quel que soit l'état de maladie, il ne nous dépouille point de notre sexe, il ne nous dérobe pas entièrement au pouvoir de l'autre; la maladie en peut affaiblir les impressions sans jamais les anéantir. D'ailleurs, la plupart des femmes qui vont au traitement du magnétisme ne sont pas réellement malades. Beaucoup y viennent par oisiveté et par amusement. . . . L'homme qui magnétise a ordinairement les genoux de la femme renfermés dans les siens; les genoux et toutes les parties inférieures du corps sont par conséquent en contact. La main est appliquée sur les hypochondres et quelquefois plus bas sur les ovaires. Le tact est donc exercé à la fois sur une infinité de parties. . . . Souvent l'homme ayant sa main gauche ainsi appliquée, passe la droite derrière le corps de la femme; le mouvement de l'un et de l'autre est de se pencher mutuellement pour favoriser ce double attouchement . . . il n'est pas extraordinaire que les sens s'allument. . . .[41]

It has been said that Benjamin Franklin was the author of the commissioners' report,[42] but this is clearly not the case. Franklin remained in Passy during most of the investigation and missed those experiments which were conducted in Paris.[43] On the other hand, Bailly's reportorial contribution is evinced by the letters that passed between Bailly and Franklin during the summer of 1784. On June 16 Bailly wrote:

> M. Bailly présente ses hommages à Monsieur Franklin et le prie de renvoyer le registre original de la commission qu'il a eu l'honneur de lui envoyer la semaine dernière, parce qu'on a indispensablement besoin de l'avoir dès le matin, qu'on [doit?] commencer à le copier. Si M. Franklin ne l'aurait pas encore lu, il peut le garder encore jusqu'à ce soir, pourvu qu'il ait la bonté de le renvoyer ce soir à Chaillot à M. Bailly.[44]

On August 9 he wrote:

> M. Bailly présente ses hommages à Monsieur Franklin. Il a l'honneur de lui envoyer premièrement la suite du registre. M. Franklin voudra bien le lire et le signer à l'endroit où il sera vu qu'il a signé. Secondement, le rapport qui doit être signé mercredi par les commissaires et présenté au roi vendredi. M. Bailly le lui envoie aujourd'hui afin que M. Franklin ait le temps de le lire.[45]

The signatures were affixed to the report "ce 11 août." The following Monday, August 16, the report was published in expurgated form, it having been thought proper to omit the commissioners' observations on the moral aspects of magnetism. These facts explain the references in Bailly's letter to Franklin on September 8:

> Comme MM. les Commissaires doivent aller voir demain jeudi M. Franklin, M. Bailly a l'honneur de lui envoyer le registre original qui doit être signé demain, afin que Monsieur Franklin puisse en prendre lecture, et signer aussi demain avec les autres commissaires. Il suffit qu'il lise depuis la page 87 où sa dernière signature est placée. Quoiqu'il n'y ait plus de secret relativement au travail de la commission, M. Franklin est prié de l'enfermer et de ne le pas laisser voir à cause de certain article sur lequel la commission n'a pas jugé à propos de s'expliquer. Monsieur Franklin voudra bien brûler ce billet. . . .[46]

Apparently a copy of the original register was made with slight alterations. On December 7, Bailly sent this final copy to Franklin, pointing out the changes that had been made in the "deux ou trois derniers articles"[47] and asking again for his signature. It is clear from these letters that Bailly was doing the actual writing and submitting the draft to Franklin for criticism and approval.

Although there is no direct evidence for Franklin's participation in the writing of the report, it is not suggested that he was without considerable influence. The intellectual vanguard owed much to Franklin's ideas.[48] As a member of the commission, fellow-academician of five members and brother Mason of two (Guillotin and Bailly), Franklin may well have aired in private conversation the views which were ultimately adopted by the commission. That he had strong views on animal magnetism there can be no doubt.[49] On March 19, one week after his appointment to the royal commission, he wrote to La Condamine:

> You desire my sentiments concerning the cures perform'd by Comus[50] and Mesmer. I think that in general

[40] "Rapport secret," 151.

[41] *Ibid.*, 147–149.

[42] See Faÿ, *Franklin*, 483, and Ford, *Franklin bibliography*, 167, 169 and 171. Van Doren, 716, writes, "It is not known whether Franklin had a hand, or how much he had, in the writing of these papers."

[43] DISC MEM 2: 30.

[44] Collected papers of Benjamin Franklin, Amer. Philos. Soc.

[45] *Ibid.*

[46] *Ibid.*

[47] *Ibid.* This letter was originally dated "Paris ce 19 Nov. 1784." The date is crossed out and "7 Xbre" has been added in the same hand.

[48] It has been suggested that Franklin inspired or had a hand in La Rochefoucauld's translations of the constitutions of the thirteen American colonies and Mirabeau's *Considérations sur l'ordre de Cincinnatus*, which, incidentally, appeared the same year as the report on magnetism.

[49] Goldsmith, 136, is mistaken in saying, "To Mesmer's doctrines he gave little thought; in his letters from Passy that summer, while the commission was sitting, he does not refer to the subject."

[50] Nicolas-Philippe Ledru called Comus (1731–1807). Ledru was a physicist and an expert on terrestrial magnetism. He compiled some of the first navigational charts showing the earth's magnetic fields. In Paris 1777–1783 Ledru conducted a series of experiments to determine the value of electrical

maladies caus'd by obstructions may be treated by electricity with advantage. As to the animal magnetism so much talk'd of I am totally unacquainted with it, and must doubt its existence till I can see or feel some effect of it. None of the cures said to be perform'd by it have fallen under my observation, and there being so many disorders which cure themselves and such a disposition in mankind to deceive themselves and one another on these occasions, and living long having given me frequent opportunities of seeing certain remedies cry'd up in curing everything, and yet soon after totally laid aside as useless, I cannot but fear that the expectation of great advantages from this new method of healing diseases will prove a delusion. That delusion may, however, in some cases be of use while it lasts. There are in every great rich city a number of persons who are never in health because they are fond of medicines and always taking them, whereby they derange the natural functions and hurt their constitutions. If these people can be persuaded to forbear their drugs in expectation of being cured by only the physician's finger or an iron rod pointing at them, they may possibly find good effects, tho' they mistake the cause. I have the honour to be, Sir, etc.[51]

When the commissioners prophesied that "M. Mesmer ne manquera pas de dire que les commissaires n'ont examiné ni sa méthode ni ses procédés ni les effets qu'il produit," [52] they were no doubt mindful of the letter which Mesmer had written to Franklin at the outset of the investigation, complaining of Deslon's cooperation with the investigators. This letter was made public between the middle and the end of August,[53] and at the same time Mesmer announced his intention of conducting a series of experiments with horses to prove that magnetism was not the result of imagination. The first week in September, Mesmer lodged a formal protest with the Parlement de Paris and demanded the appointment of a new commission to examine—not animal magnetism—but a new plan for the examination of animal magnetism. The Parlement "laid hold of it to clinch Mesmer and oblige him to expose all directly." [54] In a decree of September 6, the Parlement appointed four doctors, two surgeons, and two pharmacists as judges before whom Mesmer was to prove his doctrine once and for all and ordered that the report of these findings be laid before the Procureur Général.[55]

Meanwhile, the commissioners dined with Franklin at Passy to devise the last phases of their campaign. On September 2 and 8, Thouret [56] read before the Société Royale de Médecine two papers in which animal magnetism was denounced as pure imposture designed to take advantage of human credulity.[57] On September 4, Bailly read before the Académie des Sciences an *Exposé des expériences qui ont été faites pour l'examen de magnétisme animal,* in which the academic members of the commission offered more serious and less polemical remarks. The *Rapport des commissaires chargés par le roi de l'examen du magnétisme animal* was written for the King and his ministers and published for general consumption. The *Exposé* was intended primarily for the Academy. Bailly read it in his name and in the names of Franklin, Leroy, de Bory, and Lavoisier [58] in the presence of Prince Henry of Prussia, brother of the King.

The *Exposé* begins with a curious argument concerning the need for the investigation, the tone of which tends to confirm our opinion that Bailly had done most of the writing:

> C'était un scandale pour l'Europe de voir un peuple éclairé par toutes les sciences et par tous les arts, un peuple chez qui la philosophie a fait les plus grands progrès, oublier la leçon de Descartes qui en est le restaurateur, et renfermer dans son sein deux partis opposés, qui unissaient leurs vues et leurs pensées sur le même objet, mais qui se divisaient et se combattaient. . . . La décision était importante et indispensable. . . .[59]

Surely Franklin could not have written these words, particularly in view of the phlegmatic manner in which he was just then expressing himself in his correspondence.

The *Exposé* is less detailed than the *Rapport,* but it offers the more penetrating analysis of Mesmer's discovery:

> Ce que nous avons appris, ou du moins ce qui nous a été confirmé d'une manière démonstrative et évidente, par l'examen des procédés du magnétisme, c'est que l'homme peut agir sur l'homme à tous moments et presque à volonté en frappant son imagination; c'est que les gestes et les signes les plus simples peuvent avoir les plus puissants effets; c'est que l'action que l'homme a sur l'imagination peut être réduite en art et conduite par une méthode sur des sujets qui ont la foi. . . . La recherche d'un agent qui n'existe pas sert donc à faire connaître une puissance réelle de l'homme; l'homme a le pouvoir d'agir sur son semblable . . . action presque toujours dangereuse, que l'on peut observer en philosophe, et qu'il n'est bon de connaître que pour en prévenir les effets.[60]

The notion of the role of imagination in magnetism was not new. As early as 1780 Deslon had written:

> Si M. Mesmer n'avait d'autre secret que celui de faire agir l'imagination efficacement pour la santé, n'en aurait-il pas toujours un bien merveilleux? Car si la médecine

therapy in various types of disease, especially epilepsy. A report of this work was published in 1783, and Ledru was made *Physicien du roi.*

[51] Collected papers of Benjamin Franklin, Amer. Philos. Soc.

[52] "Rapport secret," 153.

[53] Collected papers of Benjamin Franklin (Lamotte to W. T. Franklin, August 30, 1784), Amer. Philos. Soc.

[54] *Ibid.* (B. Franklin to W. T. Franklin, September 8, 1784).

[55] *Ibid.*

[56] Michel-Augustin Thouret (1749–1810), brother of Jacques-Guillaume Thouret, who played an important part in the Revolution.

[57] These papers were published as *Extrait de la correspondance de la Société royale de médecine, relativement au magnétisme animal,* 1785.

[58] Jussieu must have dropped from the commission fairly early, for Bailly, writing to Franklin June 17 to accept a dinner invitation on behalf of the commission, says, "les commissaires sont au nombre de huit."

[59] DISC MEM **2**: 95.

[60] *Ibid.* **2**: 107–108.

d'imagination était la meilleure, pourquoi ne ferions-nous pas la médecine d'imagination? [61]

What was new was the complete separation of the mental and physical forces at work. Deslon subscribed to the fiction of the intangible magnetic fluid; the commissioners did not. The hostility of the commission's report has led Mesmer's defenders to condemn the commissioners' blindness to the value of mental therapy, but it must be admitted that neither Mesmer nor Deslon can be regarded as a psychotherapist in the modern sense of the word. They failed to appreciate the one important implication of their method. Rather it was the royal commission which recognized the enormous influence of mind over matter. If these investigators from the Faculty of Medicine and the Academy of Sciences failed to draw all the inferences which a modern critic might wish, it was perhaps because they had not set out to inquire into the therapeutic uses of the imagination, but simply the existence or non-existence of the magnetic fluid as defined by Mesmer. Their report served a very real purpose in advancing the study of the human mind by dissociating it from astrological occultism.

Some of the commissioners regarded the matter as settled once and for all. Franklin, skeptical from the outset of the value of magnetism, was less sanguine. In a letter to his grandson William T. Franklin, then in London, he wrote:

> The report is publish'd and makes a great deal of talk. Everybody agrees that it is well written, but many wonder at the force of imagination described in it as occasioning convulsions, etc., and some fear that consequences may be drawn from it by infidels to weaken our faith in some of the miracles of the New Testament. . . . Some think it will put an end to mesmerism. But there is a wonderful deal of credulity in the world, and deceptions as absurd have supported themselves for ages.[62]

The report did, indeed, provoke "a great deal of talk," including lawsuits, investigations, plays, pamphlets, open letters, verses, etc., much of it in defense of Mesmer. On September 6 Deslon, although himself threatened by Mesmer with a lawsuit, published his *Observations sur les deux rapports de MM. les commissaires* . . . and shortly thereafter a *Supplément aux deux rapports de MM. les commissaires* . . . devoted largely to the testimonials of patients who had been "cured." On September 12 appeared Jussieu's dissenting opinion, *Rapport de l'un des commissaires* . . . , which expressed the regret that his colleagues had not explored more thoroughly the positive aspects of mesmerism. On September 28 Christophe de Montjoie published a *Lettre sur le magnétisme animal où l'on examine la conformité des opinions des peuples anciens et modernes, des sçavans, et notamment de M. Bailly, avec celles de M. Mesmer . . . addressée à M. Bailly. . . .* This was a resumption of Court de Gébelin's "harmonie primitive." One of the best defenses was Servan's Franklinesque *Doutes d'un provincial* which begins, "Vous avez parlé du danger du magnétisme par la propagation des convulsions; mais vous n'avez rien dit de son inestimable bienfait en écartant les hommes de vos arts et de vos remèdes." [63]

Nevertheless, the attackers soon outnumbered the defenders. Mesmer had been made ridiculous, and by November 27, the *Journal de Paris* noted the decline of mesmerism. A burlesque entitled *Les Docteurs modernes* was presented November 16 at the Comédie Italienne; a spate of pamphlets—*Mesmer blessé, Mesmer guéri, Mesmer justifié*—flooded the salons; and the newspapers were filled with doggerel inspired by the subject. One such poem, sent to Franklin, reads:

> Le magnétisme est aux abois;
> La Faculté, l'Académie
> L'ont condamné tous d'une voix
> Et l'ont couvert d'ignominie.
> Après ce jugement bien sage et bien légal,
> Si quelque Esprit original
> Persiste encore dans son délire,
> Il sera permis de lui dire:
> Crois au magnétisme—animal! [64]

After the autumn of 1784, mesmerism disappeared rapidly in Paris, although it was much practiced in the provinces where the Puységur brothers [65] experimented with somnambulism, the forerunner of modern hypnosis.

A by-product of the investigation of magnetism was Bailly's "Lettre à M. Leroy, Lieutenant des chasses, sur la question si les animaux sont entièrement privés d'imagination."[66] We have seen that Mesmer proposed to defend his theories by demonstrating the influence of magnetism on horses. This was based on the assumption that animals were lacking in imagination and their reactions would prove the physical presence of the magnetic fluid. The non-medical members of the commission had taken cognizance of this proposal in the *Exposé* of September 4:

> Si nous n'avons pas fait d'expériences sur les animaux, que l'on regarde comme privés de l'imagination, c'est que ces expériences auraient été plus difficules et plus délicates, sans être plus concluantes. . . . D'ailleurs une grande raison pour rejeter cette espèce de preuve est qu'on annonce un fluide universel, un fluide agissant sur l'homme et propre à guérir ses maux. Il serait singulier qu'on en vantât les bons effets sur l'espèce humaine et qu'on ne pût les rendre sensibles que sur l'espèce animale. . . . [67]

[61] *Observation sur le magnétisme animal*, 46–47.

[62] Collected papers of Benjamin Franklin, Amer. Philos. Soc.

[63] *Op. cit.*, 3.

[64] Collected papers of Benjamin Franklin (J. Williams, Jr., to W. T. Franklin, October 20, 1784), Amer. Philos. Soc. It would seem that the fifth line has been misquoted.

[65] Armand-Marie-Jacques de Chastenet, Marquis de Puységur (1751–1825), and Jacques-Maxime-Paul de Chastenet, Comte de Puységur (1755–1820). Their continuing experiments at Buzancy helped to rehabilitate Mesmer's doctrines at the beginning of the nineteenth century.

[66] DISC MEM **2**: 109–135.

[67] *Ibid.* **2**: 102–103.

Bailly may have been preparing more ammunition to use against Mesmer, or he may have been simply working out the doubts in his own mind. "J'entends répéter de toutes parts aujourd'hui, Monsieur, que les animaux sont privés d'imagination; on en fait un principe; c'est bien au moins une question."[68]

Bailly is loath to suggest that man is just a superior sort of animal, but that is where his argument takes him. He begins by affirming the difference between man and animal, a difference "qui tient pour la plus grande partie à notre essence immortelle."[69] But the resemblances, he admits, outweigh the differences. If man and animal resemble one another physically, with the same organs performing the same functions, and if all thought processes be traceable to sense perceptions, must it not follow that animals are capable of thought? Bailly defines thought as a twofold process: memory and imagination. The memory receives and stores images and impressions; the imagination produces them at will in new arrangements and sequences. "Donc, imaginer, c'est se ressouvenir. La mémoire et l'imagination ne diffèrent que par la force des impressions. La mémoire est le récit des choses, mais des choses passées. . . . L'imagination est la peinture des choses comme présentes. . . ."[70] Reduced to these dimensions, the memory and imagination of animals cannot be disputed.

Bailly displays more clearly in this letter than anywhere else in his writings his indebtedness to La Mettrie and to Condillac. It is obvious that he means to suggest that the difference between man and animal is only one of degree: "la nature a tout fait sur un même plan, par des lois générales, et ne diffère d'elle-même que du plus au moins."[71] It is evident from the text that this "letter" was intended for publication and cannot be construed as private correspondence, yet there is no evidence of its appearing in print before 1790. Was it an exaggerated sense of discretion which prevented Bailly from openly allying himself with the *philosophes*? Contemporary events would seem to confirm this view.

Quite possibly as a reward for his work with the commission on animal magnetism, Bailly was appointed Pensionnaire Astronome Surnuméraire on December 12, 1784. The list of supernumeraries figures in the annals of the Academy of Science from 1717 onwards; they were scientists appointed and pensioned by the King over and above the quotas fixed by the *règlement* of the Academy. Consequently they were generally in bad odor with the elected academicians who regarded them as tyros and intruders. Bailly's enemies made much of the fact that he was a Pensionnaire Surnuméraire, but it must be said in his defense that royal intervention came nearer the end than the beginning of his academic career. His election to the Academy in the first place and his appointment as Associé were strictly on merit and seniority. There were four classes of Pensionnaires ranging from 500 to 3,000 livres per annum.[72] A receipt signed by Bailly and dated February 1, 1791, shows that he received 900 livres for a six-month period; this would place him in the second highest class of Pensionnaires. Bailly just slipped under the barrier, for, on April 23, 1785, in a show of opposition to arbitrary royal interference, the Academy adopted a measure suppressing the Surnuméraires: "il n'en sera plus admis aucun sous quelque prétexte que ce soit."[73] One cannot but wonder whether this was another manifestation of the Condorcet-Bailly feud.

About the same time, Bailly was further honored with membership in the Accademia di Padova and the Société des Antiquités de Cassel.[74] An unpleasantness in the Académie Française, however, qualified Bailly's series of triumphs. This was the break with Buffon over the election of abbé Maury.[75] Cubières tells the story in simplified form:

> J'avais dîné la veille ou l'avant-veille de la réception [*sic*] chez M. le comte de Buffon (il aimait beaucoup qu'on l'appelât le comte de Buffon); j'avais dîné chez le comte de Buffon avec Mme la comtesse de Beauharnais et M. l'abbé Maury, homme très célèbre alors par son éloquence, nous ayant lu son *Panégyrique de Saint Vincent de Paul*, M. le comte de Buffon lui donna la palme, c'est-à-dire, lui donna sa voix pour l'Académie française. Bailly vint me voir le lendemain matin et me demanda ce qui s'était passé au dîner du comte de Buffon; je lui répondis que le comte de Buffon avait donné sa voix à M. l'abbé Maury. Eh bien, me dit-il, je n'estime pas infiniment M. l'abbé Maury; mais je n'en admire pas moins M. de Buffon. M. de Buffon est mon maître dans l'art d'écrire, mais je ne le verrai plus, et il tint parole.[76]

Arago[77] adds a certain amount of plausible, if undocumented, detail. Bailly favored Maury's rival

[68] *Ibid.* 2: 109.

[69] *Ibid.* 2: 111.

[70] *Ibid.* 2: 112–113.

[71] *Ibid.* 2: 133. *Cf.* La Mettrie, *L'Homme machine:* ". . . la nature n'a employé qu'une seule et même pâte dont elle a seulement varié les levains."

[72] Maindron, 114.

[73] Académies des Sciences, *Les Membres et les correspondants de l'Académie royale des Sciences (1666–1793).*

[74] The title page of the second edition of the *Histoire de l'astronomie moderne,* 1785, offers the first mention of these affiliations. *Saggi scientifici e letterari dell'Accademia di Padova* 1: xciv, 1786, lists Bailly among the foreign members, but without date of election. Only one volume of the *Mémoires* of the Société des Antiquités de Cassel is known to have been published. This includes a list of members for 1780, but nothing beyond that date. Both of these memberships are confirmed, however, in the *Almanach royal* for 1789.

[75] Jean Siffrein, Cardinal Maury (1746–1817). Maury's eloquence won him a reputation in his defense of the clergy during the early days of the Revolution. Under the Empire he was an ardent supporter of Napoleon and became Archbishop of Paris. Louis XVIII punished him by evicting him from the French Academy!

[76] *Recueil,* xxxii–xxxiii.

[77] *Op. cit.* 2: 283–286.

Sedaine,[78] an older man whose dramatic works "balançaient largement le bagage, alors très léger, de Maury." Buffon saw in Sedaine only a heretical versifier who had dared to write: "Le style, ce n'est rien ou c'est peu de chose." Buffon is supposed to have asked Bailly to cast his vote for Maury and, when Bailly refused, at least to be absent on the day of the election. This, too, Bailly refused. His vote for Sedaine was in vain, however; Maury won.[79] Arago, Gassier, and others have insisted that "l'amertume de cette réception éloigna Buffon de l'Académie où il ne parut plus."[80] This may be a slightly colored account, for another historian says that Buffon ceased attendance at both academies after his fight with d'Alembert,[81] and Cubières says that d'Alembert maliciously placed Buffon among the honorary members because of his rare appearances at the Académie Française.[82] If these statements are true, Buffon's quarrel with Bailly did not materially alter his habits. It might be said cynically that Bailly no longer needed Buffon's patronage.

The year 1784 marked a turning point in Bailly's life in many ways. The contact with the other members of the commission on mesmerism and the clear issues between the physical and metaphysical explanations of a strange phenomenon did a great deal to scotch any illuministic trends in his thought. He never managed to adopt the gentle skepticism of Franklin; he never achieved the purity of reflective thought of Diderot; he never learned to speak up like Condorcet and d'Alembert; lacking a real sense of humor, he tended to see things without *nuance;* and yet this period marks a new maturity in his thinking and finds him a respected public figure.

By the curious workings of chance, Bailly also won the confidence of the government at this time. His writings, which might have shocked a generation earlier, now seemed innocuous. This may be a way of saying that Bailly was behind the times. It is also a way of saying that the whole attitude of the French monarchy was changing rapidly. Despite the influence of Maurepas, the ideas of the *philosophes* had had interpreters at court in the persons of Turgot, Malesherbes, and Necker, and there was a mood, even in government, for reform. Bailly was to take his first steps as a reformer under the ægis of that government.

[78] Michel-Jean Sedaine (1719–1797), poet, dramatist and sometime architect. Sedaine's operas were his chief claim to popularity in the eighteenth century, but his plays—especially *Le Philosophe sans le savoir*—have outlived them.

[79] Sedaine was elected to the Academy two years later.

[80] Gassier, 311.

[81] Maury, *L'Ancienne Académie des Sciences,* 167.

[82] *Recueil,* xxx.

VII. NEW CONJECTURES ON ANTIQUITY

The éloges of Gresset and Cook, the Academy of Inscriptions, the Indian astronomy

> Nous distinguerons, si vous le voulez bien, ce que j'ai établi comme des vérités de ce que j'ai proposé comme des conjectures.
>
> Bailly, "Première lettre à M. de Voltaire."

Before we consider Bailly as a reformer, it is appropriate to look at his last contributions to the field of belles-lettres—two *éloges* which suggest the influence of Rousseau—and the history of Indian astronomy, in which Bailly comes to defend the point of view held by Voltaire ten years earlier. These works show a vigor which, but for the Revolution, might still have brought Bailly to that high degree of perfection which he coveted. The *éloge*, so popular in the eighteenth century and fallen into such desuetude today, has not always been sterile. It has served notice on historian and critic of their errors and omissions, kept alive the memory of some memorable if minor figures and, not infrequently, offered the sort of subjective criticism which modern scholars seem unable or unwilling to embrace. Such a work is Bailly's *éloge* of Gresset, published for the first time in 1785.

The Académie d'Amiens had three times previously proposed its founder as the subject of an *éloge* without receiving any that it regarded as worthy of the prize. Bailly's fared no better, but poetic justice triumphed a century later when a member of that academy asked his colleagues to render Bailly "un honneur dont il n'a pas besoin sans doute, mais que la rigueur de nos devanciers lui a refusé." [1] By ironical coincidence, his competitor for the prize of 1785 was Maximilien Robespierre who, as chairman of the Committee of Public Safety, eight years later, was to send Bailly to his death.

The *Eloge de Gresset* is good because it is simple, because it grasps the essential qualities of its subject, and because, as Bailly himself said, "J'ai loué Gresset, mais avec justice et sans exagération. Je me suis proposé d'observer à la fois et ce qui caractérise son talent et ce qui lui manque." [2] Bailly saw in Gresset a transitional artist who felt the weakness and false brilliance of a society too much attached to superficial values and who turned to *sensibilité*, the passions and the magnificence of nature for his inspiration.

> . . . il est venu lorsque la galanterie penchait vers son déclin. Les passions, multipliées avec la société, s'étaient amincies comme le métal brillant et ductile étendu sur des surfaces; il y avait moins de liberté et plus de conventions dans la société. . . . Il retrouva la grâce, la légerté qui sont inséparables de notre nation, et la philosophie qui naissait pour suppléer à tout ce que nous perdions.[3]

Vert-Vert, *La Chartreuse*, and *Le Méchant* are singled out as the three works most likely to endure, and the first of these, written when Gresset was only twenty-four and uncontaminated by the Paris salons, is marked as his masterpiece. ". . . je dirai que le poète a été détourné de sa route première en passant de *Vert-Vert* à *La Chartreuse*." [4] *Vert-Vert* is called a "transparent" through which the reader may see into the human heart. On the surface all is elegance and *badinage*; beneath lies a deep and quiet understanding of human nature.

Bailly was particularly interested in Gresset's style and the apparent contradiction of the works and the milieux which produced them. ". . . par un contraste singulier, le poète aimable, qui avait été badin et enjoué dans le cloître, parut un homme austère dans le monde." [5] Bailly's explanation of this contrast shows us that he was developing freer and more flexible artistic standards:

> . . . il est un goût de tous les siècles et de toutes les nations qui appartient à la belle nature; il est un choix de mots et d'expressions qui dépendent des idées. Quand la pensée commande, l'expression est toujours heureuse. . . .[6]
>
> Ce n'est pas le premier exemple de cette différence entre un homme et ces ouvrages. On en est toujours surpris parce qu'on oublie que les ouvrages sont les productions d'un talent qui nous transforme, qui nous élève ou nous rend aimables, mais qui n'agit que par moments; au lieu que l'homme social est le résultat de ses habitudes et est sans cesse commandé par elles.[7]

Bailly deals here with two distinct critical concepts. The first—that form and content are inseparable—is as old as art. But the second—that artistic creation is a transcendent experience—is new in the eighteenth century. Bailly, like the pre-romantics, feels the fundamental conflict between the artist and social man, a notion which would not have occurred to Boileau despite his insistence on inspiration.

Bailly does not analyze Gresset's tragic heroes, and there is no hint of the darkly melancholic traits of preromanticism which appear in them. Yet he has grasped the essentially "romantic" quality of Gresset's work: in *Vert-Vert*, the feeling for nature; in *La Chartreuse*, the moral observation that "l'homme porte avec lui sa destinée, ses vrais biens et ses maux"; [8] and in all his works, *sensibilité*. The superiority of Bailly's *éloge* to

[1] Dubois in Académie d'Amiens, *Mémoires*, 3e série, **5**: 20.
[2] DISC MEM **1**: 373.
[3] *Ibid.* **1**: 362–363.
[4] *Ibid.* **1**: 360.
[5] *Ibid.* **1**: 369.
[6] *Ibid.* **1**: 357.
[7] *Ibid.* **1**: 369–370.
[8] *Ibid.* **1**: 359.

that by Robespierre has been attributed to this subjective approach:

> Bailly a raison; la sensibilité, c'est la source de tout intérêt. . . . La sensibilité, son concurrent ne la connaît pas; c'est une étrangère à laquelle Robespierre refuse l'hospitalité. . . . Robespierre a entrevu Gresset; il ne l'a point senti.[9]

Bailly's *Eloge de Gresset* was printed anonymously in Geneva and received no public notice, although he sent copies of it to La Harpe and to some of his colleagues in the academies. Among the recipients was the Marquise de Créquy [10] about whom Bailly told an amusing anecdote. When he visited that lady a few days after the appearance of his *éloge*:

> M. Bailly, lui dit-elle, pourriez-vous bien me donner quelques renseignements sur un éloge de Gresset que l'auteur, qui ne se nomme pas, a fait remettre chez moi? Je suis dans le plus grand embarras; il viendra me voir; il y est peut-être déjà venu, puisqu'il m'a envoyé son ouvrage. J'ai lu son ouvrage; je ne crois pas qu'on puisse plus mal écrire et pour le style et pour le fond des choses; ce sont les ténèbres avant la création; c'est l'obscurité même. Monsieur Bailly, je veux vous en faire juge.[11]

Bailly escaped, promising himself never again to send an anonymous work to a marchioness or anyone else for that matter. However, when the *éloge* was reprinted in the collected *Discours et mémoires* several years later, Mme de Créquy, who had forgotten the previous incident, "accabla l'orateur connu de compliments aussi exagérés que les critiques qu'elle avait faites." [12]

To the same period may be assigned Bailly's one remaining *éloge*—that of Captain James Cook. This work was written for the Académie de Marseille, which first proposed Cook as the subject of a *prix d'éloquence* in 1780. As no satisfactory entries were received, the award was postponed from year to year until it was finally won by Lemontey of Lyon [13] in 1789.[14] Bailly's biographers have been consistently vague about the date of composition of the *Eloge du capitaine Cook* [15] which did not appear in print until 1790. An item in the *Année littéraire* for the latter part of 1786, however, offers fairly conclusive evidence that it was written that or the preceding year. Under the caption "Académie royale de Marseille . . . Eloges du capitaine Cook" we read:

> Dans le nombre de ceux qui ont été envoyés au concours cette année, l'Académie en a distingué trois qui, avec plus de travail et de soin, auraient pu remplir ses vues. Elle invite les auteurs de ces ouvrages à les revoir, à ajouter ce qui peut leur manquer, soit pour le développement des connaissances, soit pour le style et la partie oratoire et à concourir pour le sujet qu'elle propose encore pour 1788. Ces trois éloges ont pour devise:
>
> Deus fecit; Cook dedit.
> Descripsit totum qui gentibus orbem.
> Audax omnia perpeti.[16]

Bailly's *éloge* as it stands in the *Discours et mémoires* is preceded by the epigraph:

> Illi robur et aes triplex
> Circa pectus erat . . .
> Audax omnia perpeti.[17]

If the work was presented in the competition of 1786, we may state with a fair amount of certainty that it was written after the *Eloge de Gresset,* and because of the pressure of other work in hand—the *mémoires* at the Academy of Inscriptions, the reports on the hospitals and slaughterhouses, and the history of Indian astronomy—it was probably not revised.

The *Eloge du capitaine Cook* is not one of Bailly's more successful ventures into this genre; it is not very informative about the Captain; it is lacking in continuity; and it is frequently self-contradictory. Nevertheless, it makes good reading for two reasons. Bailly displays a Rousseauistic bent not elsewhere apparent in his works, and, under the spell of an exotic subject, his descriptive prose writing has flashes of beauty reminiscent of Chateaubriand.

Here is Bailly's first and only contribution to the myth of the noble savage. This element had been surprisingly absent from his other works, perhaps because of his determination to rehabilitate the great civilization of antiquity. Even when writing of the North American Indians [18] he had refrained from generalizing on their moral state, and he had not suggested that they were any happier or unhappier than Europeans. In the *Eloge du capitaine Cook,* however, his statements are unequivocal:

> Les nations de la mer du sud nous montrent que l'homme est bon en sortant des mains de la nature.[19] J'aime à me peindre les âmes naïves et pures des habitants de Taïti, peuple ami de la paix, peuple qui vit sans défiance, riche des dons de la terre, libre dans ses désirs et dans ses jouissances, ne connaissant ni l'intérêt ni la haine, bon sans morale, juste sans lois; il a, comme au premier âge de la vie, les affections douces et les vertus de l'innocence; il a

[9] Dubois in Académie d'Amiens, *Mémoires,* 3e série, **5**: 20.

[10] Renée-Caroline de Froulay, Marquise de Créquy (1714–1803).

[11] Mérard de Saint-Just, 40–43. "C'est de Bailly lui-même que je tiens cette piquante historiette."

[12] *Ibid.,* 43.

[13] Pierre-Edouard Lemontey (1762–1826), historian and publicist. This is the same Lemontey whose sketch of Bailly in *Raison, folie, chacun son mot* is quoted elsewhere in this book.

[14] Lautard, *Histoire de l'Académie de Marseille* **1**: 345 and **2**: 442.

[15] Lalande, "Eloge," 323, is quite wrong in stating, "Les éloges de Cook, de Lacaille et de Gresset . . . le firent désirer par Buffon et par plusieurs autres membres d l'Académie des Sciences pour être secrétaire de cette illustre compagnie. . . ." Arago **2**: 329 merely says that the *éloges* of Cook and Gresset followed the history of astronomy.

[16] *Op. cit.* **6**: 287–288, 1786.

[17] Horace, *Odes* **1**: 3.

[18] ASTR MOD **1**: 285–290.

[19] *Cf.* the celebrated first sentence of Rousseau's *Emile*: "Tout est bien, sortant des mains de l'auteur des choses; tout dégénère entre les mains de l'homme."

connu à cet âge des plaisirs vifs et des peines légères. Cet état d'enfance de l'espèce humaine est l'âge d'or des poètes.[20]

Even when this Gauginesque idyl is succeeded by the account of the brutal murder of Cook at the hands of the Hawaiians, Bailly takes the defense of the natives against "civilized" interference:

> Malheureux insulaires, qu'avez-vous fait? . . . Mais plutôt, Européens, qu'avez-vous fait vous-mêmes? . . . N'avez-vous pas à vous reprocher ces idées de supériorité et de domination qui vous accompagnent dans les pays nouveaux? Quel droit avez-vous sur les peuples tranquilles d'un autre hémisphère? Vous voulez qu'on respecte la propriété individuelle, et vous violez la propriété nationale! Comment osez-vous prendre possession d'un pays habité, attenter à la liberté du souverain, employer le fer et le feu pour vous faire justice? Que répondriez-vous si les insulaires vous disaient: c'est vous qui l'avez tué?[21]

These passages recall not only many pages of Rousseau, but some fairly specific remarks on the same subject made by Diderot, particularly in the *Supplément au Voyage de Bougainville* which, incidentally, was not published until 1796. Compare, for example, the reproach addressed to Bougainville by the elder of Tahiti:

> Tu n'es ni un dieu ni un démon: qui es-tu donc, pour faire des esclaves? Orou! toi qui entends la langue de ces hommes-là, dis-nous à tous, comme tu me l'as dit à moi, ce qu'ils ont écrit sur cette lame de métal: *Ce pays est à nous.* Ce pays est à toi! et pourquoi? parce que tu y as mis le pied? Si un Taïtien débarquait un jour sur vos côtes, et qu'il gravât sur une de vos pierres ou sur l'écorce d'un de vos arbres: *Ce pays appartient aux habitants de Taïti,* qu'en penserais-tu? Tu es le plus fort! Et qu'est-ce que cela fait? . . . le Taïtien est ton frère. Vous êtes deux enfants de la nature; quel droit as-tu sur lui qu'il n'ait pas sur toi?[22]

It is just possible, of course, that Bailly had seen one of the copies of the *Supplément* which circulated in Paris in the decade before he wrote his *éloge* of Cook. It is clear, in any case, that he was under the influence of the *philosophes naturistes* and was not likely to return to his earlier theories on the origins of civilization.

The other interesting aspect of the *éloge* of Cook has to do with the literary style. Bailly describes the scenes of Cook's discoveries as vividly as if he had seen them with his own eyes and waxes eloquent on the beauties and terrors of the sea in a way which would scarcely suggest that the author had never ventured upon the sea:

> Le citoyen tranquille qui jette les yeux sur une carte maritime ignore qu'il est peu d'écueils dont la connaissance n'ait coûté des hommes, et que chaque côte a été marquée par des naufrages. La mer du Sud a des roches d'une formation singulière; plusieurs de ces îles sont des bancs de corail. La côte orientale de la Nouvelle Hollande et les îles voisines composées de ces rochers redoutables forment des récifs. . . . La mer est-elle basse, la vague vient s'y briser avec un bruit épouvantable; elle avertit du péril en répandant au loin son écume dispersée. Mais dans la haute mer, les écueils se cachent sur la surface; les flots les couvrent; et le navigateur prudent, qui a la sonde à la main, trouvant toujours une grande profondeur, croyant pouvoir s'avancer sans danger, ne voit la sonde diminuer que tout à coup, lorsqu'il est sur le rocher, et au moment où le vaisseau touche et se brise. Ainsi l'on marche le jour sans savoir si on ne court pas au naufrage; la nuit on jette l'ancre, mais dans ce repos une houle bruyante vous avertit que la mort est à vos côtés. La vie tient à un câble, tourmenté par les flots et par les vents, et que la tempête peut rompre à chaque instant.[23]

The rigors of the Antarctic are described with even more vividness:

> La pluie froide, la neige, la grêle tombent sans cesse; les agrès sont couverts de glace; ils coupent les mains qui les saisissent; tout est raidi par la gelée; les câbles sont comme des cordes de métal, les voiles sont comme des planches. . . .[24]

Throughout this account Bailly displays a strong romantic *sentiment de la nature* reflected in expressions such as "un ciel riant," "la tristesse qu'inspire un désert" or "une trame impénétrable . . . dont la nature semble couvrir sa défaillance." The ice barriers of the Antarctic continent are "un spectacle extraordinaire et magnifique" or "d'immenses débris et les restes d'un monde détruit" which inspire "un sentiment de frayeur." An analogy with Chateaubriand's second-hand accounts of America seems inescapable.

Voyages of discovery were an early and lasting topic of interest in France, and enthusiasm for Cook was widespread. But it would be interesting to know how Bailly came to write his *éloge*. One possible explanation may be found in the affiliation of Johann Reinhold Forster with the Loge des Neuf Sœurs circa 1779–1780. Forster, as naturalist to the King of England, had accompanied Cook on his second voyage to Oceania, New Zealand and the Antarctic (1772–1775) and had published in 1777 his *Observations upon a Voyage around the World*. Another good reason for Bailly's interest would be the purpose of Cook's first voyage to Tahiti in 1768. He was commissioned by the Royal Society to conduct an expedition for the observation of the transit of Venus which occurred that year, and it is likely that Bailly's attention was drawn to the voyage itself because of its scientific character.

At the end of 1785 Bailly was named to the Académie des Inscriptions et Belles-lettres, thus becoming the second and last man to belong to France's three highest academies. (Only Fontenelle before him had been so honored.) Bailly's detractors have made much of his ignorance of the languages of antiquity, and it has been

[20] DISC MEM 1: 324. This whole passage may be compared with the "deuxième état de nature" in Rousseau's *Discours sur l'origine de l'inégalité* where "l'exemple des sauvages, qu'on a presque tous trouvés à ce point, semble confirmer que le genre humain était fait pour y rester toujours. . . ."

[21] DISC MEM 1: 346–347.

[22] *Œuvres,* Paris, N.R.F., 1000–1001, 1946.

[23] DISC MEM 1: 328–329.

[24] *Ibid.* 1: 334.

suggested that his election was a *prix de sagesse* which the government offered from time to time to writers who had resisted the blandishments of *philosophie*.

It is true that Bailly's Latin was weak and that he seems not to have known Greek, Hebrew, or any of the oriental languages. This absence of linguistic equipment was always ammunition in the hands of his enemies who construed it as proof positive of the superficiality of his erudition. Arago regards his election to the Academy of Inscriptions as a vindication:

> L'Académie des Inscriptions et Belles-lettres, bien loin de partager les rancunes puériles, les préjugés aveugles de quelques enfants perdus de l'érudition, appela Bailly dans son sein. . . .[25]

Maury demurs at this reasoning:

> N'en déplaise au célèbre astronome qui ne fut, lui, que d'une seule académie, mais qui a laissé dans la science une trace plus durable que l'infortuné maire de Paris, ce n'étaient point des rancunes puériles et des préjugés aveugles qui repoussaient de l'Académie des Inscriptions l'auteur des *Lettres sur l'Atlantide*. On peut sans doute, sans avoir ni grec ni latin, être une grande intelligence et un homme fort savant, mais on ne saurait être un habile archéologue.[26]

There is no contemporary evidence that Bailly's entry into the Academy of Inscriptions was "fixed" or that his presence there was resented. We know that Bailly received a number of pensions from the government, and the legend of the *prix de sagesse* may have got started and confused with Bailly's election to the Academy because it was about the same date that he began to receive a strictly honorary pension, which Bachaumont explains as follows:

> M. Bailly était garde des tableaux du Roi; cette place était depuis cent ans dans sa famille; aujourd'hui que le *Muséum* prend couleur et qu'il a fallu en confier la garde à deux peintres, les fonctions de M. Bailly s'anéantissaient. En conséquence, M. d'Angivillier,[27] avec toutes les grâces possibles, lui a annoncé que sa place était supprimée et que Sa Majesté, pour lui en dédommager, lui donnait une pension de deux mille quatre cents livres. C'est ce qui a donné lieu à un *qui pro quo* du *Mercure* qui avait l'air d'un persiflage et que l'académicien a été obligé de relever. On croit qu'on lui a conservé aussi son logement au Louvre.[28]

Mérard de Saint-Just who, as Bailly's friend, resented the government's action in the matter seems to have confused this pension with Bailly's part in the investigation of mesmerism: "Le baron de Breteuil[29] annonça à Bailly que le roi lui accordait une pension de 2400 livres qui mit de l'aisance dans sa fortune."[30] But elsewhere he writes: "J'observe à la décharge de M. d'Angivillier qu'il fit conserver en pension les appointements en entier que Bailly avait comme garde des tableaux du roi."[31] No other source suggests that Bailly was rewarded for his work on animal magnetism, and it is likely that Mérard, writing from memory, had in mind Bailly's appointment as Pensionnaire Astronome Surnuméraire at the end of 1784, which, as we have seen, brought him 1,800 livres a year. It is further likely that the pension accorded him by d'Angivillier at the end of 1785 was a continuation or renewal of one which he had received since his father's death. Bailly continued to use his title of keeper of the King's paintings, adding the qualification "honorary."

Whether there was a *prix de sagesse* or not, Bailly was in a delicate position as a member of the other two academies. The Academy of Inscriptions had at one time forbidden its members to seek or accept seats in the senior academy, and Choiseul-Gouffier had been summoned before a tribunal of the Marshals of France to explain his conduct when he accepted election to the French Academy in 1783.[32] Bailly had to prove his capacity. He did so with considerable success[33] at the public session of the Academy following the Easter recess of 1786, when he read a "Mémoire sur la chronologie indienne." We know of only one other paper ("De l'Astronomie indienne") read by him before this academy. Both papers have unfortunately disappeared in their original form. De l'Averdy, the editor of the Academy's papers up to the Revolution, suspended his work before the volume for 1784, and when Dacier, under the Empire, tried to complete the series a number of memoirs had disappeared.[34] The substance of Bailly's two papers, however, found its way into the *Traité de l'astronomie indienne et orientale, ouvrage qui peut servir de suite à l'Histoire de l'astronomie ancienne*.[35]

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[25] *Op. cit.* **2**: 317.

[26] *L'Ancienne Académie des Inscriptions et Belles-lettres*, 326–327.

[27] Charles-Claude La Billarderie, Comte d'Angiviller or d'Angivillier (d. 1810) was a member of the Academy of Sciences and Directeur général des bâtiments du roi.

[28] *Op. cit.*, December 21, 1785.

[29] Louis-Auguste le Tonnelier, Baron de Breteuil (1733–1807), politician and statesman, was from 1783 to 1787 minister of the Département de la maison du roi. Bailly later wrote of him: "M. de Breteuil . . . était favorablement prévenu pour moi par des amis communs, et par des sentiments d'estime pour mes ouvrages et ma conduite. Mes relations avec lui ont été fondées sur les deux commissions pour le magnétisme animal et pour les hôpitaux; commissions d'où ont résulté deux rapports qui ont eu du succès et dont j'ai été le rédacteur. M. de Breteuil, voyant de longs services gratuits et sans aucune récompense, m'en a fait obtenir du roi, et je lui dois les grâces qui m'ont été accordées depuis 1785 jusqu'en 1788. . . ." (*Mémoires* **1**: 308.)

[30] *Op. cit.*, 70.

[31] *Ibid.*, 39.

[32] Arago **2**: 317–318.

[33] This is the opinion of Bachaumont, April 26, 1786.

[34] Rozière and Chatel, *Table générale* . . . , xxvii.

[35] The first of the two papers appears as Part II of the "Discours préliminaire" as Bailly indicates in a note at page lxxvii. Part I of the "Discours" bears the same title as the second of the papers and may be assumed to be identical with it. The text proper of the *Traité* is a documentation of the arguments set forth in the 180-page "Discours préliminaire" and is, therefore, more nearly akin to the *éclaircissements* of the earlier histories.

The *Traité*, a mixture of painstaking calculation and wild supposition, was published early in 1787.[36] It is the final word in Bailly's debate with Voltaire, but, as in so many debates, Bailly ends up by defending Voltaire's initial thesis on the antiquity of Indian civilization. "Richesse de la science, variété des méthodes, exactitude des déterminations, tout assure aux Indiens ou à leurs auteurs la possession et l'invention de leur astronomie." [37]

Bailly undertook the history of Indian astronomy as a further contribution to the knowledge of antiquity which he had done so much to popularize and because he thought he saw in it the utilitarian objective of offering modern astronomers a comparison with accurate, ancient observations, which would permit very fine determination of secular changes in the heavens. Perhaps also he felt that some such work was incumbent upon him as a new member of the Academy of Inscriptions. His main source material consisted of four sets of astronomical tables, two of which had not previously been published. One was brought from Siam in 1687 by de Laloubère, Louis XIV's ambassador to that country. One had been brought back from Tirvalore on the Coromandel Coast by Le Gentil. The remaining two in manuscript form—printed for the first time as appendices to the *Traité*—had come from French missionaries in India and had found their way into Naval archives in Paris. They originated in Masulipatam (just north of the Coromandel Coast) and Chrisnabouram, "ville de la presqu'île en deça du Gange." These four tables had been discovered at four roughly equidistant points around the Bay of Bengal, and they all supposed a reduction to the meridian of Benares. Bailly saw in this fact evidence confirming the existence of a highly developed school of astronomy in that area.

The initial argument, set forth in the section entitled "De l'astronomie indienne," is fairly simple. The four tables belong to different epochs, their determinations being reduced to different years as follows:

Tirvalore, 3102 B.C.
Siam, A.D. 638
Chrisnabouram, A.D. 1491
Masulipatam, A.D. 1569 (in part)
A.D. 1656 (in part)

The problem was to establish which of these tables was based on observation and thus ascertain whether the Indians had begun with modern calculations and reconstructed the picture of the heavens as they supposed it to be in 3102 B.C. (which is the modern view [38]) or were already in possession of considerable scientific knowledge at that remote date. Bailly was inclined to believe that the tables for 3102 B.C. were legitimate, which is to say based on observation.

> Si les Indiens, partis de leur époque de 1491, sont remontés dans le temps et ont calculé leur époque de l'an 3102, il faut convenir qu'ils ont une connaissance des moyens mouvements aussi exacte que la nôtre. Supposer qu'ils ont obtenu ces moyens mouvements sans anciennes observations serait une absurdité, et supposer aux Indiens des observations anciennes, inconnues, en rejetant celles qu'ils nous font connaître, serait une inconséquence.[39]

Bailly rules out the possibility of the Indians' having borrowed their tables, on the grounds that those for the era of 3102 B.C. could not have been deduced from the astronomical knowledge available to Ptolemy and Ulugh-Beg [40] and that the first tables which would permit such accurate deductions were those of Cassini and Mayer.[41] The false premise is the supposed accuracy of the tables for 3102 B.C. That year, according to the Indians, was marked by a conjunction of all the planets, which occurred within a few days of a lunar eclipse. By ingenious selection Bailly "proved" the accuracy of these observations:

> Les meilleures de nos tables, savoir, celles de la Caille pour le soleil et celles de Mayer pour la lune, donnent cette conjonction. . . . Les tables de Mayer . . . donnent cette éclipse. . . . Les tables de Cassini la font arriver la nuit. . . .[42]

Even the margin of disagreement among modern astronomers was turned to account in this argument:

> Quel est l'astronome qui oserait assurer qu'à cette distance de quarante-neuf siècles où nous sommes aujourd'hui de l'époque des Indiens les tables de la Caille ne sont pas susceptibles d'une erreur d'un demi-degré et celles de Mayer d'une erreur de trois quarts de degré; et l'on voudrait que les Indiens, avec leur astronomie inférieure à notre astronomie européenne fussent remontés par un intervalle de 4592 ans et ne se fussent écartés que de ces quantités dont, malgré notre supériorité, nous ne pouvons pas répondre nous-mêmes.[43]

However, Bailly seems to have learned his lesson about categorical statements. If his notions have been largely discredited by posterity, it must be said in his defense that he was not entirely satisfied with this preliminary research and that he expressly invited others to examine the evidence which he had adduced. " . . . c'est aux astronomes et aux géomètres à juger les preuves que nous venons de leur offrir et à décider s'il en résulte une véritable démonstration." [44] In the *Traité* even Bailly's speculation has become empirical, if we may be permitted this contradiction in terms. In the same way that Voltaire had once objected to Bailly's lost Tartar and Atlantean astronomies because

[36] The *privilège* is dated December 8, 1786.
[37] ASTR IND, lxxvi.
[38] It is now regarded as unlikely that the Indians possessed any astronomy before the second or third century B.C. I am indebted to Professor Otto Neugebauer of Brown University for his comments on the state of the sciences in ancient India.
[39] ASTR IND, liii.
[40] *Ibid.*, xxi.
[41] *Ibid.*, xxxvi.
[42] *Ibid.*, xxvi.
[43] *Ibid.*, lv.
[44] *Ibid.*, lxiv.

"on n'a nulle nouvelle de cet ancien peuple" [45] Bailly now rejects the theory of a lost Egyptian astronomy from which the Indians borrowed. "On nous oppose une astronomie ignorée et que nous avons droit de regarder comme imaginaire . . . nous ne pouvons juger ce que nous ne connaissons pas." [46]

The second part of the "Discours préliminaire" is the paper "De la Chronologie indienne" previously read at the Academy of Inscriptions in April 1786. Here Bailly reinforces his astronomical evidence with material taken from the chronology of Indian fable. The Indians' fantastic chronology ends with four periods, clearly fabricated, in a ratio of 4:3:2:1:

Krita Yuga,	1,728,000 years
Trita Yuga,	1,296,000 years
Dwapara Yuga,	864,000 years
Kali Yuga,	432,000 years

The last period begins in 3102 B.C., corresponding with the astronomical tables of Tirvalore. It was curious that, in a system comprising millions of years of existence, the calendar should have been based on a period of which less than 5,000 years had elapsed. The exaggeration of this chronology was explained by Le Gentil and others [47] as a reckoning by days, which gives a more modest table as follows:

Krita Yuga,	4800 years
Trita Yuga,	3600 years
Dwapara Yuga,	2400 years
Kali Yuga,	1200 years

The discrepancy between the length of Kali Yuga and the actual number of years elapsed since 3102 B.C. was explained by adoption of a new calendar at the beginning of Kali Yuga. The significance of this chronology, however, was that it confirmed Bailly's faith in the Tirvalore tables. Both the tables and the period of Kali Yuga date from 3102 B.C. and mark the establishment of the solar year as the standard calendar unit. Bailly was inclined to discard the first two periods as fabulous [48] and reckon Indian history from the beginning of the third period. This had the advantage of reconciling it with Persian, Chinese, Egyptian, and Hebrew chronologies, estimates of the age of the earth and the dating of the deluge. Furthermore, the third period seemed to coincide with the invention of the zodiac. The Indians had originally reckoned their years from the winter solstice, and Bailly showed that at the beginning of the third chronological era the first of Aries had, in fact, coincided with the winter solstice. If these deductions were correct, the Indians had a clear claim to priority in the use of both the zodiac and the solar year.[49]

The implications of Bailly's thesis were extremely important to the historians who regarded the school of Alexandria as the point of origin of modern astronomy. Even in the *Histoire de l'astronomie ancienne* Bailly had not dealt very kindly with the Greeks. In the *Traité* he accuses them of having borrowed and tampered with a science which they did not understand: " . . . et s'ils n'avaient pas voulu la corriger, ils nous auraient laissé une science plus avancée." [50] Bailly's faith in the antiquity of Indian astronomy has been shown to be unfounded. The tables which he used are remarkably accurate and are still the subject of some speculation, but they are undoubtedly lineal descendents of Hellenistic or Babylonian astronomy of a relatively late date. Whatever were the merits of his book, Bailly predisposed later writers against him by rejecting the classic view that modern astronomy dates from the school of Alexandria. For the *Traité* does have some merit. Bailly clearly indicates two lines of inquiry to be explored as a result of his research: a revaluation of ancient astronomical data for the purpose of determining secular changes in the heavens, and a new appreciation of the ancient history of Asia. He promised to undertake the second of these tasks himself in an "ouvrage dont les matériaux sont déjà rassemblés." [51] This work has never been published and may not even have been completed owing to the exigencies of political events. It would be interesting to know in what way Bailly's thought developed, for in his published works he never exploited the possibilities of showing that the Oriental apathy was the result of "l'Asie esclave" to which he had referred in the *Eloge de Leibnitz*. Satisfied with repeating the words "indolence" and "orgueil," he left to others the task of filling in the modern social implications of Asiatic history.

The review of the *Traité de l'astronomie indienne* which appeared in the *Année littéraire* anticipated, probably more correctly than its author then imagined, the fate that was to befall it. "Nous ne doutons pas que des savants en ce genre ne trouvent des réponses à ses raisonnements, mais on aura bien de la peine à lui ôter son amour et sa prédilection pour ses chers Indiens." [52] The immediate response in astronomical circles was not, however, unfavorable. Bailly's work was reviewed at considerable length by John Playfair in a paper read before the Royal Society of Edinburgh in 1789 with this altogether remarkable tribute:

[45] ATLAN, 6.

[46] ASTR IND, lxxi–lxxii.

[47] Le Gentil in MEM AC SCI 1772; Abraham Roger, *Mœurs des Bramines;* Beschi, *Grammaire tamulique.*

[48] ASTR IND, cxiv.

[49] *Ibid.*, cxlii–cxliii.

[50] *Ibid.*, clxxvi.

[51] *Ibid.*, cxlv. This may be a reference to the manuscript *Histoire de l'origine des Perses et des Indiens* mentioned by Cubières and alluded to by Mérard de Saint-Just. See *supra* chap. V, n. 125.

[52] *Op. cit.* **8**: 48, 1787.

The fact is that, notwithstanding the most profound respect for the learning and abilities of the author of the *Astronomie indienne*, I entered on the study of that work not without a portion of that scepticism which whatever is new and extraordinary in science ought always to excite, and set about verifying the calculations and examining the reasonings with the most scrupulous attention. The result was an entire conviction of the accuracy of the one and of the solidity of the other. . . .[53]

Six years later, Lalande was still able to say that this history justified Bailly's nomination to the Academy of Inscriptions by its "infinité de recherches que personne que lui peut-être n'aurait pu faire aussi bien."[54] For a century or more Bailly continued to have his followers. As late as 1896 an English mathematician and antiquarian wrote:

Whatever may be the truth as to the origin of the interesting tables which have given rise to so much discussion, it is certain that the ancient Hindu astronomers, many centuries before the Christian era, were in possession of knowledge derived from observations made by them of the motions of the heavenly bodies, which they were able to use and did actually use in very accurate computations of time.[55]

The first writer to speak out publicly against Bailly's theory was his old friend Laplace, who wrote in his *Exposition du système du monde* (1796):

Les tables indiennes supposent une astronomie assez avancée, mais tout porte à croire qu'elles ne sont pas d'une haute antiquité. Ici je m'éloigne avec peine de l'opinion d'un illustre et malheureux ami. . . . Nos dernières tables astronomiques, considérablement perfectionnées par la comparaison de la théorie avec un grand nombre d'observations très précises, ne permettent pas d'admettre la conjonction supposée dans les tables indiennes.[56]

Nevertheless, Laplace agreed with Bailly that the Greeks and the Arabs had probably learned the first elements of astronomy from India.

It would be wrong to see in the *Traité de l'astronomie indienne* a rejection of the notion of progress. Indian astronomy confronted Bailly with the same dilemma which he had encountered in writing the *Histoire de l'astronomie ancienne* and the letters to Voltaire. As a believer in the fundamental superiority of the West and of the eighteenth century, he was bound to condemn the traditionalist elements of Oriental culture. Yet his enquiries led him inevitably to the conclusion that there had once been great scientific progress in the East. He supposed a flourishing period in the early days of man's history on earth, followed by a long era of intellectual stagnation and apathy. Initially he had regarded Hellenism as a renascence, a first step in the rediscovery of essential principles. For a time, under the influence of Court de Gébelin, he made a fetich of the unknowable, unidentifiable moment when he believed all threads of history joined in a single beginning. Like Court de Gébelin, he came to believe that nothing of the past was really lost, and that one had but to interpret correctly the "sublime philosophy" of the ancients to plot a course for the future. The *Traité* must be read as an attempt to interpret that "sublime philosophy" and fill the hiatus in man's progress.

[53] Remarks on the Astronomy of the Brahmins (read March 2, 1789) in Royal Society of Edinburgh, *Transactions* **2** (2): 138.

[54] Eloge, 326.

[55] Brennand, *Hindu astronomy*, London, Straker, 1896, 34.

[56] *Œuvres* **6**: 403–404.

VIII. REFORM BY MANDATE

Commissions on the hospitals, slaughterhouses, arts and crafts

> Lorsque dans un siècle de lumières on appelle la raison
> à son aide, la raison doit finir par être la maîtresse.
>
> Bailly, *Mémoires.*

His increasing celebrity as a writer, the prestige of membership in three academies, the success of the report on animal magnetism and his cordial relations with the Court brought Bailly an unexpected opportunity to play a new role in public affairs. When authority stirs, it is generally in response to public pressure and widespread acceptance of the view that reform is needed. The government of Louis XVI was scarcely an exception to that rule, yet in the years immediately before the Revolution there were indications of the government's preparedness to take the initiative in certain types of reform. It was inevitable that in these matters the government's stipendiaries should be the agents of reform. Bailly may have taken his first step towards being a revolutionary when, at the request of the government, he abandoned his books and telescopes to become a reformer.

On December 10, 1785, Bailly was appointed to the commission which the Academy of Sciences chose, at the King's behest, to examine a project for a new Hôtel-Dieu. The work of this commission was to continue for more than two years and result in three reports, which were written by Bailly. The other members of the commission were Lavoisier and Darcet, who had served with Bailly in the study of animal magnetism, Lassone,[1] Daubenton,[2] Tenon,[3] Laplace,[4] and Coulomb.[5] Their work is doubly impressive even today, for the humanitarian spirit which inspired it and for the systematic and thorough manner in which the investigation was conducted.

[1] Joseph-Marie-François de Lassone (1717–1788), chemist and chief physician to Louis XVI and Marie Antoinette.

[2] Louis-Jean-Marie Daubenton (1716–1800), naturalist and anatomist, official of the museum of natural history in the Jardin du Roi, professor at the Collège de France. Daubenton was for a long while a friend and collaborator of Buffon, but, like Bailly, ultimately quarreled and broke off relations with him.

[3] Jacques-René Tenon (1724–1816), surgeon, later published his own *Mémoire sur les hôpitaux de Paris,* 1788.

[4] Pierre-Simon, comte and later marquis de Laplace (1749-1827), the famous physicist and mathematician. It was Laplace's house at Melun which served as Bailly's last shelter before his arrest and execution. During his brief tenure as Minister of the Interior after the *dix-huit brumaire,* Laplace procured a government pension for Bailly's impoverished widow. His most famous works are the *Traité de mécanique céleste,* 5 v., 1799–1825, and *Exposition du système du monde,* 2 v., 1796. His complete works were published under the auspices of the Academy of Sciences, 14 v., Paris, Gauthier-Villars, 1878–1912.

[5] Charles-Auguste de Coulomb (1736–1806), physicist and engineer, inventor of the torsion balance.

The hospital question was a very important one in Paris in the eighteenth century. Although there were some twenty-five *hôpitaux, hospices, maisons de santé,* and *maisons de charité* in operation, there was only one large hospital dedicated exclusively to the care of the sick. This was the Hôtel-Dieu, located partially on the Ile de la Cité and partially on the left bank of the Seine, run by a bureau under the immediate supervision of the Archbishop of Paris. The Hôtel-Dieu generally passed for a den of horrors; it was constantly overcrowded and pestilential; only the poorest of the poor, who had no other recourse, accepted its ministrations.

In 1737 the Hôtel-Dieu was partially destroyed by fire, and a number of projects for replacing it were brought forward during the next few years. The three principal suggestions involved moving it. One of these called for enlarging the Hôpital Saint-Louis; another, enlarging the Couvent des Bons-Hommes at Passy; the third, construction of an entirely new hospital on the left bank, across the river from Passy, near the Ecole Militaire. In 1748 the abbé Le Jeune made the first proposal for use of the Ile des Cygnes.[6] Le Jeune's plan called for a five thousand bed hospital to be built at public expense, the cost to be reimbursed by charity and by a series of lotteries. This plan was criticized in the *Mercure de France* for February, 1749, as impractical: the hospital would be too expensive, would be too far from Paris (*sic!*) and would pollute the waters of the Seine. Public apathy allowed these proposals to languish; the Hôtel-Dieu was repaired; and the Bureau continued its old ways. A new conflagration in the night of December 29–30, 1772, stirred up new interest in these early plans. The Procureur-Général strongly urged the recalcitrant Bureau to consider moving to the Ile des Cygnes. The

[6] The Ile des Cygnes has disappeared today. It lay near the left bank of the Seine directly between the present locations of the Eiffel Tower and the Palais de Chaillot. It was separated from the Champ de Mars by a low, marshy area which was filled with water only when the river was high. Towards the period of the Revolution this low spot was gradually drained and filled. It was in this "fossé," in sight of his home and the scene of his triumph and "crimes," that Bailly was executed November 12, 1793. The ditch has disappeared also, and ditch and island lie beneath the embankment of the Quai d'Orsay. See Potin, "Ile des Cygnes" in Société historique d'Auteuil et de Passy, *Bulletin* **4**: 290–293, and Vacquier, "Lieu de décapitation de Bailly" in Société d'histoire et d'archéologie du VII[e] arrondissement, *Bulletin* **5**: 39–50.

King's architect Caqué [7] and Panseron [8] drew up new plans for the building and devised a self-liquidating financial scheme. In 1775 Claude-Humbert Piarron de Chamousset proposed the rebuilding of the Hôtel-Dieu as well as additions to the Hôpital Saint-Louis and to the Grands Cordeliers in the Faubourg Saint-Marceau. His plan included the establishment of a central laundry for these three hospitals on the Ile des Cygnes. On July 22, 1778, the staff of the Bureau of the Hôtel-Dieu formally and positively announced that "l'Hôtel-Dieu ne serait ni déplacé, ni divisé, mais qu'il serait agrandi." [9]

In 1785 appeared a *Mémoire sur la nécessité de transférer et de construire l'Hôtel-Dieu de Paris, suivi d'un projet de translation de cet hôpital.* The author was Bernard Poyet, Architect of the City of Paris.[10] His plan called for the construction on the Ile des Cygnes of a vast circular building with a large central court, radiating wings connected at their outer extremities by circular galleries and outlying facilities for service and contagious wards. One of the novel features of the plan was a proposal for 500 private rooms in the total capacity of 5,184 beds. The revenue of the private rooms was envisaged as a major contribution to the budget of the hospital—an astounding idea in an era when hospitalization was universally regarded with aversion. It was this plan which the Baron de Breteuil referred to the Academy of Sciences in December, 1785, with instructions to comment on the need for a new hospital and the feasibility of Poyet's plan.

Bailly's first report, submitted September 2, 1786, and published in November or December of the same year, falls into three parts: an inquiry into existing conditions at the Hôtel-Dieu, an "examen du projet de M. Poyet," and "Réflexions sur les moyens de secourir les pauvres malades et sur la meilleure disposition des bâtiments destinés à les recevoir." This is more than a routine government report. True, it is filled with statistics and technical details, but it is animated with the same passion for reform that one finds in Voltaire's commentary on Beccaria and in Mirabeau's *Observations . . . sur Bicêtre.*

> Un hôpital qu'on élèverait aujourd'hui doit être, dans un siècle éclairé comme le nôtre, le résultat des connaissances acquises; et il doit réunir tous les secours que la physique perfectionnée peut offrir pour le soulagement des malades. . . . Il était nécessaire de voir les [hôpitaux] mêmes, où les règles ont dû être mises en pratique, où les avantages du local et de l'administration sont constatés par des guérisons, et où les inconvénients du local, les négligences, les préjugés sont mis à découvert par la mortalité.[11]

The commissioners undertook a personal inspection of a number of Paris hospitals—la Charité, Saint-Sulpice, la Salpêtrière and les Invalides—for purposes of comparison, but they were flatly refused any cooperation at the Hôtel-Dieu. For want of access to the premises and records of the Hôtel-Dieu, they had to establish their facts from second-hand sources. Fortunately, the medical members of the group were familiar in a general way with the hospital, and Tenon had spent three years in residence there as an intern in surgery. Fortunately, also, Poyet had been able to obtain ground-plans and measurements of the buildings. The library of the Academy of Sciences contained records of the vital statistics of Paris from 1720 onwards, including figures on the patients treated at the Hôtel-Dieu, its mortality rate, etc. The burden of blame for lacunæ was placed, by implication, on the Bureau: ". . . nous établirons les faits dont nous nous croyons certains; ce qui ne sera pas contesté restera démontré. . . ." [12]

The "Examen de l'Hôtel-Dieu" makes shocking reading even in the dispassionate light of history. If we enter at some length into the sordid details of the report, it is in order to appreciate the warm-hearted, hard-headed approach to their problem which the commissioners used. They determined that the daily average of cases at the Hôtel-Dieu was about 2,500. In times of emergency, the daily average had in fact reached 4,800. But these estimates, based on actual experience, showed a much lower rate of hospitalization in Paris than in other cities. The Hôtel-Dieu of Lyon, for instance, catering to a population one quarter as large as Paris', annually cared for half the number of patients received by the Hôtel-Dieu of Paris. " . . . Cette cause ne peut être que la répugnance des pauvres pour l'Hôtel-Dieu de Paris. Lorsqu'elle sera cessée, le nombre des malades augmentera et dans une proportion peut-être considérable que nous ne pouvons pas apprécier." [13] Against these requirements, the Hôtel-Dieu offered 1,219 beds, 486 of which were single, 733 of which were double, providing in all facilities for 1,952 patients. With additions then under construction and still others still in the planning stage, the hospital might, under optimum conditions, provide 1,996 beds for a total of 2,729 patients—or approximately half the estimated requirement.

But even these figures, the commission pointed out, were misleading. Inadequate housing for the 283 staff members and bribery on the part of patients to secure double beds for single occupancy were responsible for

[7] Pierre Caqué (d. 1767) designed the portal, choir and high altar of the Temple de l'Oratoire, rue St.-Honoré.

[8] Pierre Panseron (b. 1736), professor of architecture at the Ecole Militaire, Inspecteur de Bâtiments to the Princes de Conti, wrote a number of books including *Eléments d'architecture,* Paris, 1772; *Recueil de jardins anglais et chinois,* 1783; and *Recueil des profils d'architecture,* 1787.

[9] Batcave, Projets de transfert de l'Hôtel-Dieu à l'Ile des Cygnes au XVIII[e] siècle, in Société historique d'Auteuil et de Passy, *Bulletin* **5**: 192–196.

[10] Bernard Poyet (1742–1824), student of Charles Wailly, winner of a *prix de Rome.*

[11] DISC MEM **2**: 138.

[12] *Ibid.* **2**: 141–142.

[13] *Ibid.* **2**: 151–152.

an inequitable arrangement under which patients were frequently obliged to sleep three, four, five, or even six to a bed.

Nous imaginons bien que c'est la petitesse de l'emplacement et le défaut de lieu qui forcent de mêler les infirmiers avec les malades et de priver les uns de leurs lits pour coucher les autres; mais cet abus prouve que les ressources mêmes que paraît présenter l'Hôtel-Dieu sont en partie illusoires, et qu'au lieu d'avoir 1219 lits, il n'en a réellement qu'à peu près 1000 pour les malades. . . .[14]

The real test of the hospital, however, was not in its size, but its efficacy. The question was whether, with too many beds in the wards and too many patients in the beds, it was possible to treat sickness effectively. On this score, the situation was regarded as hopeless:

Le 6 janvier de cette année, [la salle] Saint Charles avait 340 malades; vingt-huit lits au moins contenaient chacun quatre personnes. Sans doute des gens en santé qui seraient au nombre de 340 dans une même salle et couchés quatre dans un lit se trouveraient fort mal à leur aise. Nous ne cherchons point à émouvoir; nous rendons compte raisonné à l'Académie; nous ne voulons exposer que des faits et des calculs. Mais c'est un fait que, si des gens en santé avaient droit de se plaindre de cette affreuse disposition, les malades doivent en être repoussés par la répugnance et n'y être amenés que par le désespoir. C'est un fait que, quelle que soit l'insensibilité des misérables que la nécessité y condamne, cependant le spectacle des maux dont ils sont de toutes parts environnés, et dans le lit qui les avoisine et dans leur propre lit, ajoute au sentiment de leurs maux; c'est un fait que les morts y sont mêlés dans le même lit avec les vivants; et quand cette association des malades dans un lit ne ferait que rendre plus fréquentes les méprises des remèdes et des aliments, ce danger suffirait pour en proscrire l'usage. Mais à ces raisons et aux réclamations de l'humanité se joignent des raisons physiques qui dévoilent d'autres inconvénients. . . .[15]

The other "inconvénients" included the "humeurs," "démangeaisons," "vermine," and "fétidité" to which the patients were exposed, the impossibility of maintaining proper temperatures for individual patients and, above all, the complete absence of peace and quiet, which the commissioners recognized as the greatest aids to healing.

Que penser d'un hôpital où des malheureux, ainsi entassés dans le même lit, ne peuvent obtenir ce sommeil désirable que lorsqu'ils se concertent pour que les uns se lèvent et veillent une partie de la nuit tandis que les autres dorment? [16]

The conclusion was, of course, that all but single beds were urgently to be dispensed with, but the commission was not sanguine about achieving this improvement at the old Hôtel-Dieu. " . . . ce n'est pas que nous ne sachions pas qu'on est résolu d'en abandonner le funeste usage . . . , mais nous savons aussi que tout ce qui est décidé n'a pas toujours son exécution." [17]

[14] *Ibid.* **2**: 160–161.
[15] *Ibid.* **2**: 165–166.
[16] *Ibid.* **2**: 173.
[17] *Ibid.* **2**: 179.

The physical arrangement of the Hôtel-Dieu offered little consolation. The wards communicated directly with one another and had few windows, generally with only one exposure; the stair wells were poorly ventilated and served only as shafts to transmit the vile odors of the lower floors to the upper stories; the stair wells also made service difficult and greatly increased the fire hazard from combustibles stored directly beneath the patients; the so-called *salle des convalescentes* (there was no male convalescent ward) was located on the top floor, and its only means of egress was through the smallpox ward; there was no exercise area for ambulatory patients; the mental ward, with only twenty-six beds, was adjacent to the surgical section; there was no isolation ward for contagious diseases; all the hospital linen was ineffectively washed in the polluted waters of the Seine and hung in the windows to dry; straw mattresses and feather quilts were used over and over again and finally carted off with the corpses through the streets of Paris; the latrines were filthy and inadequate; the surgical ward consisted of four rows of beds in the passageway to the bread, wine, and linen storerooms and served also for the daily reception of out-patients; the operating room opened on a terrace beneath the lying-in ward where sewage from that section was thrown, and operations were conducted in the center of the room which was filled with surgical patients waiting their turn; the lying-in ward itself usually had three or four women to a bed; both the lying-in and surgical wards overlooked the heavily traveled rue de la Bûcherie where a traffic count recorded 168 vehicles, mostly heavy commercial drays, per hour.

Si le défaut de l'emplacement excuse cette inconséquence inhumaine, la conservation de cet emplacement n'a point d'excuse. Le premier degré d'insalubrité d'un hôpital est de retarder la guérison des malades; le dernier est d'ajouter à leur maladie des maux qu'ils n'avaient pas.[18]

The commission was convinced that the fetid air was the chief source of infection and the medium by which disease was normally passed from person to person. The report therefore dwells at some length on the subject of ventilation and the air-space requirements of the average individual. A comparison of the facilities of eight Paris hospitals showed that whereas the patient at the Hôtel-Dieu enjoyed only 1¼ to 1½ cubic *toises* (about 500 cubic feet) of air-space, the Salpêtrière had 7½ cubic *toises* and the Charité, 10 cubic *toises* per patient. The commission concluded that "l'Hôtel-Dieu doit être le plus insalubre de tous les hôpitaux." [19]

The condemnation of the Hôtel-Dieu was thus far based on the theoretical points of what Bailly called "la physique perfectionnée." Turning to the most conclusive of all proof—the mortality rate— the commission found statistical proof to confirm Beaumarchais' judgment of medical *savoir:*

[18] *Ibid.* **2**: 201
[19] *Ibid.* **2**: 227.

. . . s'il n'emporte point le mal,
Il emporte au moins le malade.[20]

The following table gives some notion of the relative merits of several leading European and Parisian hospitals:

Hospital	*Mortality rate*
Edinburgh	1 in 25
Rome	11
Lyon	13
Saint-Denis	15
Versailles	8
Saint-Sulpice	6
Charité	7
Hôtel-Dieu	4

Even the Bureau of the Hôtel-Dieu, in an official report of 1773, had admitted a rate of 1 in 5½, which still made it the highest mortality rate among European hospitals. In some types of treatment, the rate was even higher. It was known, for instance, that the hospital sustained almost annual epidemics of puerperal fever in which half the patients died. Comparable statistics on this scourge in other European hospitals showed:

Hospital	*Mortality in childbirth*
London	1 in 59
Geneva	90
Dublin	110
Manchester	128

The commission felt that the higher mortality rate shown by all Paris hospitals might be ascribed to climatic or other conditions beyond the control of the medical profession, but by any standard the Hôtel-Dieu had an appallingly bad record. It seemed, indeed, that its chief concern was to "emporter le malade."

L'Hôtel-Dieu en cinquante-deux ans, sur 1.108.741 malades, en a perdu 244.720, à raison d'un sur quatre et demi; la Charité, qui n'a qu'un mort sur sept et demi, n'en aurait perdu que 168.700: d'où résulte le tableau effrayant que l'Hôtel-Dieu, en cinquantre-deux années, a enlevé à la France 99.044 citoyens qui lui auraient été conservés si l'Hôtel-Dieu avait un emplacement proportionnellement aussi étendu que celui de la Charité, et si les malades y avaient été traités comme ils le sont dans cet hôpital. La perte . . . répond à 1906 morts par an, et c'est environ la dixième partie de la perte totale et annuelle de Paris.[21]

It could not even be argued that the high mortality rate of the Hôtel-Dieu was an effect of insufficient funds and enforced economy. The commission looked into the cost of hospitalization and found that the Hôtel-Dieu spent 22 sous 5 deniers per day per patient as against Saint-Sulpice's 17 sous 1 denier. Moreover, inadequate facilities and inefficient administration kept patients in the Hôtel-Dieu for an average of 43 days as compared with 23 for both Saint-Sulpice and the Charité. The number of patients admitted could have been doubled without additional expenditure.

With this bill of particulars, the indictment of the Bureau was clear. Surely Bailly, confident of the King's support, must have been ironical when he wrote:

Nous rendons une pleine justice aux citoyens vertueux qui régissent cet hôpital; c'est l'amour de l'humanité, c'est le zèle de la piété qui les conduisent dans cette bonne œuvre difficile et entièrement désintéressée. Si, dans ce rapport, nous avons relevé quelques abus qui ne tiennent point à l'emplacement resserré de l'Hôtel-Dieu, nous n'avons point prétendu blâmer l'administration; nous avons eu l'intention de l'éclairer; nous avons encore eu le motif de prévenir la répétition de ces abus dans la construction projetée d'un nouvel hôpital.[22]

The examination of Poyet's proposal offers several objections to the site and construction despite the great merit of the project. "Si l'hôpital de M. Poyet était construit, nous conclurions à l'approuver en entier, à y transporter sur le champ les malades." [23] However, it was felt that Paris might have better facilities at smaller expense. The Ile des Cygnes was unsatisfactory because the level of the island would have to be raised above the river's flood stage and because the building of a hospital there would entail also the building of quais, bridges, embankments, and other incidental construction. Moreover, the excessive dampness of the river bottom militated against the health of the patients. The Ile des Cygnes was not easily accessible from the working-class neighborhoods which lay then, as today, mostly in the northern and eastern sections of the city. Especially, the commission balked at the prospect of 5,184 patients under one roof. The unpleasant picture of the Hôtel-Dieu made it seem impossible to bring that many persons together in one place without perpetuating the horrors of the old establishment. So the commission offered a plan of its own, set forth in the "Réflexions . . . "—a plan in every respect the antithesis of conditions at the Hôtel-Dieu.

The point of departure was the assumption that ideally the best way to care for a patient is in his own home. Failing that, the hospital should be as small and as accessible as is compatible with efficiency. The commission considered and rejected the establishment of parish hospitals patterned after Saint-Sulpice "où règnent l'ordre, la propreté, l'économie" [24] only because the cost of twenty or thirty such hospitals would have been prohibitive, the land hard to find, and because of the impossibility of maintaining a skilled staff of surgeons and doctors in each. A large hospital had the advantage of planning for the needs of the whole community, maintaining specialized wards for different diseases, especially the contagious ones, and providing anonymity for those whose pride or moral shame might keep them from going to parish hospitals. The plan was, therefore, a compromise between the single large hospital advocated by Le Jeune, Caqué, Panseron, and

[20] *Le Barbier de Séville* II, xiii.
[21] DISC MEM **2**: 251.
[22] *Ibid.* **2**: 258.
[23] *Ibid.* **2**: 275.
[24] *Ibid.* **2**: 281.

Poyet and the multiple small clinics which seemed to the commission the ideal, if impractical, solution. The compromise was evidently suggested by Louis XVI himself:

> Il a senti qu'un grand hôpital est une grande calamité, et la bonté souveraine a eu la pensée d'y substituer plusieurs hôpitaux. Il faut que le pauvre le sache . . . ; il faut surtout qu'il se souvienne, lorsqu'il sera couché seul dans ces hôpitaux, qu'il le doit autant à la sensibilité de l'homme qu'à la bienfaisance du monarque.[25]

The commission called for the construction of four 1,200 bed hospitals more or less at the cardinal points of the compass and on the outskirts of the city. These were to be built to the same plan: parallel wards separated by wide courtyards and joined at the extremities by communicating galleries. The hospitals were to be three stories high, the first floor to be restricted to convalescent patients, the second for bedridden patients, the third for staff. The wards were to run east and west in order to admit the maximum of sunlight in winter and northern breezes in summer. The patients were to have single, three-foot iron beds with a minimum of three feet between beds, arranged in two rows the length of each ward, leaving a twelve-foot passageway at the center of the room. Floors were to be of tile or stone; the windows, large and numerous; window frames and casements were to be of metal; all timber and woodwork was to be fireproofed; each ward was to have three fire exits; the stair wells were to be wide, well lighted, and well ventilated; and no combustibles were to be stored in any portion of the hospital occupied by patients. The commission recommended the letting of laundry, bakery, butcher, and other supply contracts to commercial houses in order to reduce the confusion of activity. Only a small laundry was to be maintained by each hospital to accommodate the contagious wards, whose linen was to be marked and kept separate from the rest. The contagious wards themselves were to be in complete isolation and all their refuse burned daily in their own courtyards. Special attention was also given to the number, arrangement, and cleaning of latrines. The commission wanted functional architecture:

> La construction des quatre hôpitaux que nous proposons ne sera pas d'une dépense considérable, du moins relativement à l'utilité de son objet, si on exclut du projet de ces bâtiments toute magnificence extérieure, toute décoration de luxe. . . .[26]

If one excepts the strictly eighteenth-century ideas of plumbing and heating, the commissioners' report was far in advance of its times. When, in 1878, a new Hôtel-Dieu was finally completed, its builders deferred to the ancient and respectable abuses of the old one, giving it a monumental, gloomy post-office architecture.

The commission proposed a modest start on the four-building program with the conversion and enlargement of two existing hospitals, both under the jurisdiction of the Hôtel-Dieu: Saint-Louis in the Faubourg du Temple and Sainte-Anne near the Observatoire. For the other two hospitals the commission suggested the site of the Célestins convent near the Arsenal and a location near the Ecole Militaire. The last two would receive their water supply from the Seine; the first two were to increase existing facilities either by drilling new wells or by diverting and damming streams. Finally the commission recommended the demolition of that part of the Hôtel-Dieu lying on the left bank of the Seine, the remaining fabric to be remodelled and used solely as an emergency hospital and out-patient clinic for the center of town.

Although the plan conceived by Bailly and his fellow academicians was shelved and forgotten during the Revolution, for a few years the prospects of its implementation were good. The first report was submitted to the Academy September 2, 1786, and adopted as read. Published by the King's order—"Sa Majesté a adopté les vues qui y sont proposées, en se déterminant à établir quatre nouveaux hôpitaux aux extremités de Paris."[27]—the report had an immediate success. Bachaumont wrote on New Year's Day, 1787:

> Le mémoire concernant l'Hôtel-Dieu, par l'Académie des Sciences, cause une fermentation qui s'accroit de plus en plus. On sait aujourd'hui que c'est Bailly qui a tenu la plume, et cette rédaction lui fait infiniment d'honneur. Ce rapport est un modèle pour la clarté, la précision, les recherches, les calculs, les résultats fondés sur la saine physique et la bonne médecine.

Even *L'Année littéraire* applauded the report and its recommendations and was moved to call it a "mémoire . . . qui présente le tableau le plus affligeant et qui tient le lecteur dans une longue et pénible angoisse."[28]

On December 29, 1786, the commission was reconstituted at the request of the Baron de Breteuil to amplify the plan of the first report, considering in detail the location, facilities and cost of the new hospitals. Two members of the commission, Tenon and Daubenton, were sent off to England and the Netherlands to tour hospitals and report on innovations abroad. Those who remained in Paris worked feverishly during the spring on the problem of land acquisition. In an interim report published in June of 1787 they offered a modified plan, revised in the face of practical difficulties. It was decided to proceed immediately with additions to Saint-Louis. The buildings of Sainte-Anne were to be razed and a whole new hospital erected on the site. The two other locations proposed in the first report were found on further examination to be undesirable. The commission selected instead the religious establishment of la Roquette which was fairly close to Saint-Louis, but would have the advantage of sharing the

[25] *Ibid.* **2**: 320.
[26] *Ibid.* **2**: 304.
[27] *Ibid.* **2**: 321.
[28] *Op. cit.* **3**: 44, 1787.

burden of the most densely populated section of the city, and, for a western site, the abbey of Sainte-Perrine de Chaillot. Two days after the commission's second report, the King signed a decree in council implementing its recommendations and providing the legal authorization for use of the land. A further change of plans was made, however, in August when it was decided to disband the Ecole Militaire and the King made its buildings available for one of the hospitals, thus replacing the site at Sainte-Perrine. Poyet, who had designed the hospital projected for the Ile des Cygnes and who had, in a sense, set the whole business afoot, was charged with the building of the two new structures at Sainte-Anne and la Roquette. The remodelling of Saint-Louis and the Ecole Militaire was placed in the hands of Raymond [29] and Brongniart [30] respectively.

The third and final report of the commission was submitted March 12, 1788. Tenon and Coulomb had been unable to tour Holland as planned, but had made a thorough study of hospitals in England, and a large portion of the last report is given over to their findings. Particularly they were impressed by the English institution of the general dispensary catering to out-patients, which corresponded to the commission's expressed views that the best way to care for a man was in his own home. They accordingly included provisions for such dispensaries in Paris. Another aspect of English medical care that attracted the visitors was budgetary. The picture of the "administration éclairée" of English hospitals was perhaps exaggerated, but it was sure to make for odious comparisons with the unsavory tableau of the Hôtel-Dieu which had already been offered to the public. The commission concluded its work with detailed plans from Poyet's drafting-board. These were an amplification of the ideas set forth by the commission in its first report. The members could boast that their new hospitals would not have their equal anywhere in Europe for salubrity, efficiency, and pleasantness. Sunlit wards and galleries were to replace the dark holes of the old Hôtel-Dieu, and gardens planted with medicinal herbs were to replace the rumbling traffic of the rue de la Bûcherie.

By March of 1788, despite or because of the government's financial distress, the hospital program had evolved into a public drive in which private individuals were participating. Persons of modest means as well as the affluent came forward with voluntary contributions, and the commission was able to announce that a total of 2,200,000 livres had been raised. Even abroad there was interest in this concrete manifestation of the enlightenment, and Franklin wrote Leroy in praise of the "memoirs and elegant prints of your projected hospital." [31] But the great philanthropic crusade fell a victim to the Revolution; the hospitals were not built; what became of the funds is one of the minor mysteries of the age. Only the reports remain as a sort of futile protestation of the temper and aspirations of France on the eve of the Revolution. For Bailly, however, they had immediate import because they brought him to the attention of the public at a critical moment and in such a light as to make him a natural choice for public office.

On January 20, 1789, a commission of almost the same composition (Lassone and Tenon were dropped; Tillet [32] was added) was appointed to investigate various proposals for removing and rebuilding the Paris slaughterhouses. Again Bailly was chosen to write the report. Laurent de Villedeuil, Minister of the Maison du Roi, 1788–1789, succeeding Breteuil, was no doubt favorably impressed by the service which these men had rendered in their reports on the hospitals. The problem was not unlike that involved with the hospitals; the congestion, disagreeable odors, fire hazards and menace to health which made the old *tueries* obsolete were defended by the butchers on the grounds that they were inextricably bound up with the convenience of location. The commission's report of May 23, 1789, recommended the relocation of the slaughterhouses on the outskirts of Paris, the initial cost to be liquidated by twenty-seven year leases to private interests, after which they would become public property. This scheme was directly tied in with the new hospital program in that it was proposed to assign all profits from the slaughterhouses to the budgets of the four projected hospitals.

Another task, started under the ministry of the Baron de Breteuil but apparently not brought to completion, was the establishment of a "corps . . . d'ingénieurs privilégiés de l'académie." The Duc d'Agen, Lavoisier, Condorcet, Tillet, Bailly, and Desmarets [33] were named Commissaires Perpétuels des Arts to supervise the publication of the Academy's description of arts and crafts [34] and to advise on the encouragement of those craftsmen—opticians, instrument makers, etc.—whose work lay outside the regular *communautés* or embraced several crafts. In a paper entitled "Réflexions sur les observations insérées dans la lettre de M. le Contrôleur-Général" [35] Bailly proposed a corps of

[29] Jean-Arnaud Raymond (1742–1811), like Poyet a winner of the *prix de Rome*, member of the Academy of Architecture and later of the Institute.

[30] Alexandre-Théodore Brongniart (1739–1815), member of the Academy of Architecture, was the designer of many Paris buildings. His finest creation is probably the *Bourse*, built under the Empire.

[31] Letter of October 25, 1788, in *Writings* (ed. Smyth).

[32] Matthieu Tillet (1720–1791), famous agronomist, authority on weights and measures, author of numerous articles on the grain-flour-bread economy.

[33] Nicolas Desmarets (1725–1815), chemist and physicist, had been inspector of manufactures in the Limousin and Champagne. From 1788 to 1792 he served as Inspecteur Général et Directeur des Manufactures de France. He was the author of several articles on arts and crafts in the *Encyclopédie*.

[34] *Description des arts et métiers*, Paris, 1761–1789. There are 103 descriptions.

[35] *Recueil*, 120–125.

artisans directly under the King's patronage, authorized to construct and sell instruments without the control of the *communautés*, to hold regular meetings, elect their own officers, discuss their work and give public lectures. There were to be twenty-four *brevetés* chosen by the Academy of Sciences. There were to be no fees involved, and membership was to be for life. Bailly was careful to say that the proposed corps should be a working rather than a talking association:

> Ce n'est point une académie nouvelle que le gouvernement doit établir. . . . Le mérite essentiel d'un artiste est d'opérer. Quand il invente ou perfectionne un instrument, on attend de lui plutôt un modèle que des mémoires.[36]

Between 1759 and 1780, the Academy had published descriptions of 86 arts and crafts at a very considerable financial loss. In 1780 the printer Moutard took over the publication and attempted to recoup the loss by simplifying typography and layout and by cutting prices in order to increase sales. Nevertheless, Moutard lost over 3,000 livres in five years on the publication of the next seven descriptions. In an "Exposé de ce que l'Académie des Sciences a fait et de ce qui lui reste à faire pour la description complète des arts"[37] the Commissaires Perpétuels pointed out that the collection was not yet half finished and asked for an annual government subsidy of 6,000 livres to meet printing costs and to permit the hiring of writers (including foreign technical experts). They also suggested that the government guarantee a number of subscriptions for distribution to provincial academies, local libraries, etc. Neither the "Exposé" nor Bailly's "Réflexions" was published in the history or memoirs of the Academy, and it seems likely that these projects, like the hospitals, came to grief in the Revolution.

Between 1785 and 1789 Bailly served an intensive and extensive tour of duty for the government on a number of reform projects. He was obliged to come to grips with a variety of administrative problems normally beyond the field of an astronomer or man of letters. In this respect he fulfilled what one of his critics has called the obscure ambition to become a sort of French Franklin.[38] The reports on the hospitals especially won him wide acclaim and probably account, more than any other single factor, for his election to the Estates General and his nomination as Mayor of Paris. Always, however, Bailly counted on the benevolent patronage of an enlightened monarchy; he had never to worry about the source of the funds which he was charged with spending or even the source of his own income. When he had obtained the suffrage of the Academy, he could speak with the authority of the Crown behind him. In fact, Bailly had become a courtier. It is said that in 1787 he became Secrétaire de Cabinet de Madame[39] and was offered (but refused) the *cordon noir* and a title of nobility.[40]

This was a very different situation from the precarious position in which he was shortly to find himself, dependent for guidance on his own *lumières* and for support on the fickleness of a revolutionary populace. Bailly later admitted that he had had no concept of the complexities of a revolution or of the role that he was to play:

> Quand j'ai été appelé aux élections, je ne pouvais pas soupçonner la part qui me serait successivement donnée à l'administration publique ni l'influence que j'aurais sur les affaires.[41]
>
> Je croyais que, dans un siècle éclairé, des hommes assemblés, et pouvant délibérer sur leurs intérêts, feraient de grands changements.[42]

He might well have added, " . . . comme à l'Académie," for that was his frame of reference. Like most of his contemporaries, convinced, because he had said it so often, that he was living in an era of enlightenment, he never doubted that deliberation would produce results which were the work of reason. The success of his reports written for the Academy was something of a trap which fate set for him and into which he walked innocently and confidently.

In 1787 Bailly, at the age of fifty-one, finally married. His wife was Jeanne Leseigneur, widow of Raymond Gaye, who had been Caissier du Clergé and Greffier au Département des Gens de Mainmorte.[43] Mme Bailly was a year or two his junior and childless. She was a quiet and retiring woman who never interfered with her husband's public life and was apparently not interested in creating a salon. Only twice during the Revolution did she participate in public functions with her husband, and these were both church services. Their married life seems to have been quite happy for the five years it lasted. The Goncourt brothers, who

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[36] *Ibid.*, 123.

[37] *Ibid.*, 126–146.

[38] G. Walter, "Bailly" in *Dictionnaire de biographie française.*

[39] Mérard de Saint-Just, 78; Nourrisson, 349; Sepet, Jeu de Paume, in *Revue des questions historiques* **49**: 512. *Madame* was probably Louise de Savoie, eldest daughter of Victor-Amadée III and wife of Louis XVI's brother Louis-Stanislas-Xavier, Comte de Provence, later Louis XVIII. Mérard de Saint-Just observes, " . . . il ne s'y refusa pas, et je crois qu'il eut tort."

[40] Mérard de Saint-Just, 80; Lefèvre-Deumier, 325–326. The *cordon noir* denoted a *Chevalier de l'ordre de Saint-Michel.* This order was founded by Louis XI in 1469 and abolished in 1789. Louis XIV had limited its membership to 100. Mérard de Saint-Just quotes Bailly as saying, "Celui qui a l'honneur d'être des trois premières académies de France est assez décoré aux yeux des hommes; le cordon noir n'y pourrait rien ajouter." If this account is true, it is the only instance of Bailly's having refused an honor, and his motive for doing so in this case is not clear. Moreover, the anecdote does not square well with Bailly's pretensions of grandeur two or three years later as Mayor of Paris.

[41] *Mémoires* **1**: 1.

[42] *Ibid.* **1**: 8.

[43] An extract of the *acte de mariage* may be found under "Bailly" in Jal's *Dictionnaire.*

held Bailly in contempt, extended their feeling to "la petite Mme Bailly" whom they described "le couvant de l'œil, le gardant du regard, directrice de son estomac. . . ."[44] Nourrisson saw in them "quelque chose de M. et de Mme Jourdain, de la bourgeoise qui voit clair et du bourgeois entiché, non d'aristocratie nobiliaire, mais de l'aristocratie tout aussi enivrante que confère la popularité."[45] Neither Mérard de Saint-Just nor Cubières has left a clear picture of Mme Bailly. Among her contemporaries, few have recorded their impressions of her. The Marquise de Créquy could not abide her,[46] but we have no reason to suppose this opinion unbiased. Lalande said she was "d'un âge à inspirer de la considération et de l'attachement à un homme de mérite qui ne pouvait être déterminé par les motifs ordinaires de fortune ou de beauté."[47] The later attempts to reconstruct Mme Bailly's character seem to be largely undocumented.[48]

[44] *Histoire de la société française pendant la Révolution*, 85.
[45] *Op. cit.*, 359.
[46] *Souvenirs de la marquise de Créquy* 7: 70–71, Paris, 1903.

[47] Eloge, 329.
[48] Mme Bailly was in poor health during the last year or two before Bailly's death. After his execution she was almost friendless and completely destitute. Dussaulx, in gratitude to Bailly who had saved him from the Paris mob, sent her an allowance out of his own pocket. (See *Moniteur*, An V, no. 72.) It was not until December 8, 1796, that Mme Bailly was voted a pension by the Corps Législatif as the widow of a patriot who had died for his country. She died of smallpox in 1800.

IX. BAILLY, "REVOLUTIONNAIRE SANS LE SAVOIR"

The Estates General, Bailly Mayor of Paris, constitutionalism vs. *republicanism, the fall of the liberals, Bailly's trial and death*

> Le peuple est souvent ingrat envers ceux qui l'éclairent. L'ignorance se défend avec vigueur; elle a toujours en réserve des armes offensives. Combien de grands hommes auraient vécu plus tranquilles, auraient été honorés, et seraient morts dans leur patrie, si une langue savante eût renfermé les vérités qu'ils avaient découvertes. Il est des temps où il faut dérober à l'envie les bienfaits de l'esprit comme ceux du cœur, cacher sa vie, suivant le précepte des anciens, et n'instruire les hommes qu'après sa mort.
>
> Bailly, *Histoire de l'astronomie ancienne.*

Jean-Sylvain Bailly's role in the events of the French Revolution for the years 1789–1791 has been described by his biographers in rather more detail than the rest of his life. There is a twofold reason for this. It is the most fully documented part of his life, and it was as a revolutionary that Bailly exerted the most immediate influence on the lives of others. By contrast, the last two years of Bailly's life are extremely obscure. We scarcely know the itinerary of his wanderings or the dates of his residence in the provinces, much less his preoccupations. There is still to be written a full account of Bailly's activities from 1791 to 1793. It is proposed here merely to note the principal events of the revolutionary years, suggesting the practical problems which confronted the philosopher and the frustrations and failures which brought him to the guillotine.

When, on April 21, 1789, Bailly closed the door of his house at Chaillot and strolled along the Seine toward the Salle des Feuillants, neither he nor anyone else could foresee the day when a man named Fouquier-Tinville would, in the name of liberty and public tranquility, sign his death warrant. It was a pleasant spring morning, and, as he had started before 8 o'clock, he stopped on a park bench to rest. A young man whom he did not recognize approached him and said, "Vous allez au District des Feuillants; vous y serez nommé électeur." [1] Bailly was surprised by this opinion. He had remained entirely aloof from the political manœuvering which preceded the Revolution. Like most informed persons he had watched with increasing disappointment the *assemblées des notables* which had no other effect than to underline the urgent need for reform. He had applauded in November of 1788 Necker's announcement of the convocation of the Estates General, for he anticipated "non une révolution, mais un changement qui, sans en pouvoir déterminer l'espèce, devait être à l'avantage de la nation." [2] It is true that in December, 1788, he was one of the 108 academicians who signed a request asking the right to elect their own delegates to the forthcoming Estates General,[3] but he does not seem to have regarded himself as a candidate. In retrospect, his vanity was much swollen by this very fact:

> Nul homme à Paris ne peut dire que je lui aie demandé ou fait demander son suffrage, pas même que j'aie témoigné aucun désir des places où je suis parvenu. Je suis un exemple bien sûr qu'on peut parvenir à tout et aux premiers honneurs sans intrigue. Ceci doit être dit pour la consolation des honnêtes gens et pour l'encouragement de la jeunesse à suivre le droit chemin.[4]

The strange young man was right; before the day was over, Bailly was chosen first elector from Chaillot.[5]

On April 26, at the first meeting of the Assemblée des Electeurs at the Archevêché, Bailly was chosen secretary. He was proposed, in fact, for the presidency and received forty votes for that office, an incident of which he later wrote, "Je n'avais pas assez de présomption pour me croire capable de conduire les autres. . . . Je fus nommé secrétaire, emploi qui me convenait beaucoup mieux." [6] In this capacity, Bailly edited from April 26 to May 21 the *Procès-verbal des séances et délibérations de l'Assemblée générale des Electeurs de Paris* [7]—which forms three volumes "de la plus haute valeur historique." [8] This election represents Bailly's first encounter with the conflict between popular will and royal authority. It had been prearranged that the electors should sit under the presidency of the Lieutenant Civil and that the regular clerk of the Châtelet should serve as secretary, but the electors insisted that they would deliberate only with freely elected officers. The withdrawal of the officials of the Châtelet was a portent of the later retreat and rout of the old order.

The next day Bailly was appointed one of the thirty-six *commissaires* charged with drawing up the *cahiers* of the third estate of Paris. This document, completed May 23, included most of the provisions later

[1] *Mémoires* **1**: 9.
[2] *Ibid.* **1**: 3.
[3] Chassin **1**: 79–83.
[4] *Mémoires* **1**: 9.
[5] Chaillot was incorporated into Paris as the first *arrondissement* in 1784. The wall established by the *fermiers-généraux* to facilitate the collection of duties effectively cut it off from its country environs. It was the tax, however, not the æsthetic loss, which prompted the line: "Le mur murant Paris rend Paris murmurant."
[6] *Mémoires* **1**: 21.
[7] The *Procès-verbal* was continued, May 22 to July 30, by Duveyrier, a Paris lawyer.
[8] Chassin **1**: xxv.

voted by the Constituent Assembly, and Bailly regarded the work of his committee as the true cornerstone of constitutional government. On May 8, Bailly, as secretary of the electoral assembly, composed a protest against the suppression of Mirabeau's *Journal des Etats généraux* and asked the nobility and the clergy to cooperate in procuring complete liberty of the press during the deliberations of the Estates General. The principle of the free press found its way into the *cahiers:* "La liberté naturelle, civile, religieuse de chaque homme . . . [exclue] toute recherche sur ses opinions, ses discours, ses écrits, ses actions." [9]

On May 12, Bailly was the first of the 407 electors to be chosen deputy to the Estates General. The previous day it had been proposed to exclude from the deputation all persons who held government appointments or pensions. Bailly had taken the floor to announce with great candor—and perhaps, for that reason, with great astuteness—that he considered himself ineligible for election.

> . . . je me crois obligé de déclarer à l'assemblée que je tiens la plus grande partie de ma fortune et des grâces et des pensions du gouvernement . . . je crois même devoir prévenir mes collègues que dans le cas où, malgré cette motion et les motifs d'exclusion qu'elle établit, on me ferait l'honneur de me nommer, je me ferais un devoir de refuser.[10]

The motion for exclusion was cried down, and Bailly's frank avowal did a great deal to establish his credit as a man of integrity. The deputies were sworn in on May 20. On Saturday, May 23, Bailly, having read before the Academy of Sciences his report on the *tueries,* departed forever from the academic world to the world of politics at Versailles.

Bailly's election to the Estates General was a presage of moderation. His respect for the law and for royal authority was more deeply rooted than his notions of equality and popular government. He wanted reform, but, as he admits in his *Mémoires,* he had no precise measures in mind. His sole weapon was the conviction that reason must inevitably win out over prejudice and ignorance. When the King heard of his election, he observed to Villedeuil, "J'en suis bien aise; c'est un honnête homme." [11] The same attitude attended his nomination as *doyen* or president of the commons on June 3. Bailly's first display of disobedience, if it can be called that, occurred June 6, when he headed a delegation from the commons to the King to discuss the unification of the three estates. Contrary to custom and contrary to the orders of the Garde des Sceaux, Bailly refused to kneel before the King, explaining later, "J'étais blessé des distinctions humiliantes." [12] This concern for outward show was perhaps more characteristic of Bailly than any determination to win a victory of ideas.

By June 17, seventeen members of the clergy having come over to the commons, the third estate constituted an actual majority of the Estates General and, on a motion made by Sieyès, by a vote of 491 to 90, declared itself the Assemblée Nationale. The original officers of the commons resigned, but Bailly was immediately reelected president. On June 20, when their hall was closed by the King's order on the pretext of preparing for the royal session of the 23rd and when the deputies at Guillotin's suggestion repaired to the tennis court and took their famous oath, Bailly insisted that the hostility was directed entirely against the King's ministers and not against the King himself. "L'Assemblée . . . était donc unie de cœur et d'esprit avec le roi et n'avait pas intention de rien faire contre son autorité légitime. . . . " [13] Similarly, he defended the King despite the latter's nullification of the Assembly's decisions. He wrote of the royal session of June 23, "Malheureux prince, où vous engage-t-on, et combien on vous trompe!" [14] There is a certain inconsistency in Bailly's view that the King was the dupe of his ministers, for he mentions the respect which he, Bailly, had for these same ministers prior to the Revolution. As president of the National Assembly, however, he seems to have felt some obscure obligation to take sides against them. "Non seulement je n'ai pris aucune nouvelle relation qui aurait pu être suspecte, mais . . . le devoir m'a fait rompre ou au moins suspendre les anciennes, qui avaient toujours été très légitimes." [15]

Bailly has generally been pictured as an innocent in politics, because he followed rather than led the course of events. The facts indicate that he was cautious, perhaps weak, but scarcely innocent. Twenty years before the Revolution he had remarked in the *Eloge de Leibnitz:*

> . . . sur la scène du monde on ne peut que rarement juger des causes par les effets. Ainsi que dans une longue file de boules d'ivoire, la dernière seule est mise en mouvement par l'impulsion donnée à la première, de même autour des trônes les passions pressées agissent les unes sur les autres de degré en degré jusqu'au souverain, qui souvent cède aux plus subalternes lorsqu'il paraît commander. Voilà l'écueil des calculateurs et des politiques.[16]

Bailly was convinced that the King was yielding to subalterns when he sided with the privileged classes, but it was equally clear that the King would have to come around to the views of the commons. The Estates General had been called to solve the financial difficulties of the government; that meant taxation; and, in the last analysis, it would be the commons, not the nobility or the clergy, who would pay the taxes. Certainly Bailly was aware of the mood among his fellow dele-

[9] *Mémoires* **1**: 37.
[10] *Ibid.* **1**: 49.
[11] *Ibid.* **1**: 71.
[12] *Ibid.* **1**: 104.
[13] *Ibid.* **1**: 191.
[14] *Ibid.* **1**: 214.
[15] *Ibid.* **1**: 106.
[16] DISC MEM **1**: 192.

gates when he replied to the King's master of ceremonies, "Je crois que la nation assemblée ne peut pas recevoir d'ordre." [17] At the same time, Bailly regarded Mirabeau's more heated reply ("Allez dire à ceux qui vous envoient que la force des baïonnettes ne peut rien contre la volonté de la nation") as entirely out of order. Bailly's words were calculated to identify him with popular ideals without provoking violence or creating an irreparable breach between the commons and the throne.

He had his first experience with mob violence on June 23 and 25 when the crowds that had come out from Paris threatened to come to blows with the royal troops. Bailly and Clermont-Tonnerre together persuaded them to disperse by promising to have the guards removed from the National Assembly. On the twenty-fifth also, Bailly received a delegation of twenty members of the Paris Electoral Assembly who had come to congratulate the National Assembly on its behavior. Bailly invited them to "calmer l'effervescence du peuple et de lui annoncer que la paix est le premier moyen nécessaire au succès des délibérations de l'Assemblée nationale." [18]

When on June 26 and 27 the majority of the clergy and a portion of the nobility joined the commons, Bailly regarded the first phase of the Revolution as won. "Je partis sur-le-champ pour Chaillot, et j'emportai cette joie que je voulus répandre tout le long de mon chemin." [19] Bailly stepped down from the presidency of the Assembly on July 2. The following day he received messages and delegations from the three academies, from the assembly of electors in Paris and from the National Assembly expressing their approbation of his conduct of the Estates General through its stormiest period. The delegates from the Assembly were headed by the Archbishop of Bordeaux and the Duc de la Rochefoucauld, a signal honor considering that Bailly's guiding principle had been the equality of the third estate with the privileged orders. Bailly's satisfaction did not last long, however. The dismissal of Necker and the appointment of Breteuil made known on July 12 caused general consternation. Despite his attachment to Breteuil, Bailly shared his colleagues' views.

> . . . comme homme, je l'ai vu bon, sensible, droit et loyal. . . . Quant à ses principes politiques, ils n'étaient ni révolutionnaires, ni constitutionnels: ambassadeur pendant trente ans, accoutumé à parler au nom du roi, il ne connaissait que son autorité; justice d'une part, obéissance de l'autre: voilà ses maximes. Il avait une réputation de despotisme qui n'était pas favorable pour être rappelé au ministère dans la circonstance des états-généraux.[20]

Without having consciously formulated his ideas, Bailly was then by implication both *révolutionnaire* and *constitutionnel*. While the Assembly passed a bill giving a vote of confidence to Necker and establishing the principle of ministerial responsibility, Bailly wrote a personal letter to Breteuil telling him in so many words that he was unhappy to hear that he had been named minister and warning him not to underestimate the determination of the National Assembly.

The same day Bailly heard for the first time the rumor that he was being mentioned for the post of Prévôt des Marchands, the post then held by Flesselles. The dismissal of Necker and the massing of troops in and about Paris precipitated a crisis in the capital. On July 13 the assembly of electors, which, having served its purpose, should have disbanded, and which the Bureau de la Ville, the Garde des Sceaux and the King had tried unsuccessfully to disband, constituted itself the municipality of Paris. When the news of the events of July 14 reached Versailles, the National Assembly had its first real triumph. The King, powerless to cope with the situation, threw himself upon the mercy of the Assembly. Bailly was asked to draft the speech which the King proposed to deliver in person the morning of July 15 and in which he would take this momentous step. The language of the speech as read was certainly not Bailly's; it was unartful but, for that very reason, moving. (Bailly, be it said to his credit, observed, "Ce discours n'était pas celui que j'avais fait; . . . mais je crois que celui-ci vaut mieux." [21]) However, the speech probably embodied Bailly's suggestions. For the first time, the King used the term "National Assembly," and he expressed his confidence in the will of the nation.

> Eh bien, c'est moi qui ne suis qu'un avec la nation; c'est moi qui me fie à vous. Aidez-moi dans cette circonstance à assurer le salut de l'état. Je l'attends de l'Assemblée nationale . . . et, comptant sur l'amour et la fidélité de mes sujets, j'ai donné ordre aux troupes de s'éloigner de Paris et de Versailles.[22]

The Assembly forthwith appointed a deputation including Bailly, Lafayette, Clermont-Tonnerre, and Sieyès to take the good news to Paris. Theirs was a triumphal progress through the city, with cries of "Vive le roi," "Vive la nation," "Vive les députés" greeting them on all sides. At the Tuileries they were welcomed as "les anges de la paix." [23] At the Hôtel de Ville, the applause and the tumult inside and out was such that most of the eloquence was lost. Lafayette managed to say that "le roi a été trompé; mais il ne l'est plus" [24] and to congratulate the electors on their courage in seizing power. The Archbishop of Paris proposed a *Te Deum*, and, as the delegation was preparing to depart for the cathedral, a cry arose calling for Lafayette

[17] *Mémoires* **1**: 214. Bailly says that these words were addressed to his colleagues and were not intended as a reply to the King.
[18] Chassin **3**: 443.
[19] *Mémoires* **1**: 253.
[20] *Ibid.* **1**: 308.
[21] *Ibid.* **2**: 5.
[22] *Ibid.*
[23] *Ibid.* **2**: 17.
[24] *Ibid.* **2**: 20.

to be Commandant Général de la Milice Parisienne. When Lafayette had accepted and the clamor had subsided a bit, another voice called for Bailly as Prévôt des Marchands. Still another voice said, "Non pas prévôt des marchands, mais maire de Paris!" The crowd took up the cry, and Bailly, weeping with emotion, stammered out his acceptance at the same time protesting his unworthiness and incapacity.[25]

The fact that Bailly had heard rumors of this event three days before it occurred suggests that it was not unpremeditated. In a letter written July 16 to Moreau de Saint-Méry [26] Bailly says, "Il me semble que c'est vous qui avez eu la bonté de me proposer pour maire de Paris; je vous dois les suffrages de l'Assemblée." [27] Even if Moreau de Saint-Méry proposed Bailly, there is the further question of why he did so. Was it simply a spontaneous gesture of esteem, or were there wheels within wheels? A curious and unconfirmed clue is offered in the memoirs of a gossipy and frequently inaccurate Englishwoman, Grace Dalrymple Elliott.[28] This lady claimed that she had lunched with Bailly and Lafayette at the Duc d'Orléans' on July 14:

> Je compris par la teneur générale de leur conversation qu'ils étaient venus consulter le duc au sujet des événements qui se passaient à Paris, et j'appris plus tard que ce jour même Lafayette fut nommé commandant en chef et Bailly maire de Paris. Pendant que nous étions à déjeuner, nous entendîmes le canon; bientôt après, on nous apprit la prise de la Bastille, et ces messieurs partirent avec une grande précipitation.[29]

She is certainly in error in saying that Bailly and Lafayette were named to their new posts the same day that the Bastille fell, and Bailly claims to have spent the whole day of July 14 at Versailles.[30] But perhaps the date itself is not of paramount importance. By Bailly's own account, he had previously (on June 29) sought the advice of the Duc d'Orléans on political manœuvers in the National Assembly. The very purpose of his visit thus belies the apparent innocence with which he explains the interview:

> J'avoue ici avec simplicité mon ignorance. Bien neuf à toute intrigue, bien peu instruit des manœuvres qui devaient incessamment éclater, je l'étais encore moins de la part qu'on lui en a attribuée; j'avais admiré, quand il passa avec la minorité de son ordre, et sa popularité qui trouvait la nation dans les communes, et son zèle pour la chose publique qui le portait à la réunion. Je voyais alors en lui le premier de la noblesse des états, et je le jugeai plus propre à m'éclairer et à me dire jusqu'à quel point je pouvais soutenir les droits contre les prétentions.[31]

Playfair, in the *History of Jacobinism,* says quite clearly that Bailly's appointment was the work of the Orleanists:

> The Duke of Orleans and Mirabeau saw in him a man fit for their purpose; and by raising a man of reputed integrity and a man of learning to such a situation, the confidence of the people would be obtained, and the men of letters in general would be attached to the Revolution. This last was not, perhaps, immediately any great object, but promised ultimately to be so. . . . As both [Lafayette and Mr. Bailly] were of the first deputation, they were proposed and proclaimed by the people. Insurrection was then, to use their own expression, organized, and two ambitious men placed at its head. . . .[32]

The plausibility of this explanation is increased when we consider that Bailly's account of his relations with the Duc d'Orléans was written three years after the fact, when such an avowal might have been dangerous and could only have been motivated by a desire to record events as they occurred.

It is further worthy of note that Bailly was favorably impressed by Mirabeau [33] despite Mirabeau's intrigues [34] against him. Of course, from the vantage point of 1792 it was safe to praise Mirabeau who, almost alone among the revolutionaries, died a natural death while his political character was still unsullied. There is no incontestable evidence for the statement that Bailly's nomination to the mayoralty was the work of these men, but there is every reason to believe that Bailly was not as young in intrigue as he wished to make his readers believe—an innocence which most of his biographers have accepted without question. It is altogether possible that Playfair's suppositions are correct, that Bailly, intoxicated by his success in the Assembly, had become politically ambitious and that he accepted the support of the Orleanists when it was offered to him.

The popular acclamation of Bailly as mayor was confirmed in due course by an election on which he insisted. Bondfield [35] wrote to Franklin on August 8:

> Your friend Mons. Balli [*sic*] is chief magistrate of Paris; the Marquis de Lafayette General and Commander in Chief. . . . I am satisfied that you will be elated at the liberal sentiments that appear to reign. You will see in our archbishop's report that they are not [innocent ?] to the proceedings of America which they quote as models. . . .[36]

[25] *Procès-verbal . . . de l'Assemblée générale des Electeurs de Paris* 1: 459.

[26] Médéric-Louis-Elie Moreau de Saint-Méry (1750–1819), president pro-tempore of the Electoral Assembly. Saint-Méry spent several years of voluntary exile in America after the King's suspension.

[27] Chassin 3: 566. Bailly's reference to "les suffrages de l'Assemblée" has to do with the confirmation which he sought and received from the National Assembly.

[28] Grace Dalrymple Elliott (1758?–1823) was the mistress of the Prince of Wales and "an occasional source of solace to Orléans."

[29] *Journal de ma vie . . .*, 269–270.

[30] Bailly claims to have gone to the Assembly at 10 A.M. "Je n'ai pris que le temps d'aller dîner; je suis revenu. . . ." (*Mémoires* 1: 356 and 360.)

[31] *Ibid.* 1: 257.

[32] *Op. cit.* 1: 140–141.

[33] *Mémoires* 1: 303.

[34] *Ibid.* 2: 154–155.

[35] John Bondfield, merchant and United States commercial agent at Bordeaux.

[36] Collected papers of Benjamin Franklin, Amer. Philos. Soc.

Bailly embarked on his new career with liberal sentiments, perhaps, but without any notion of his responsibilities and duties. With the fall of Necker and the assassination of Flesselles, the whole task of provisioning Paris had devolved upon the new municipality. The resignation of de Crosne, the chief of police, had added the burden of law enforcement. No one among the electors had had any experience in city government, and certainly Bailly had had none. At Bailly's request, Ethis de Corny,[37] the Procureur du Roi, remained in office temporarily and furnished a valuable series of memoranda on the organization and functions of the municipality. Bailly admits candidly that he was more taken by the honor of his office than by its responsibilities:

> . . . j'acceptai sans savoir de quel fardeau je me chargeais; . . . je crus tout bonnement être prévôt des marchands sous le nom de maire de Paris. Je savais que cette place n'était point pénible, je savais avec quelle facilité elle avait été souvent remplie; et je ne fus frappé que de l'honneur qu'on me faisait. . . .[38]

Bailly was in office less than a week when he learned the error of his first impression. By Tuesday, July 21, he was already wrestling with the scarcity and consequent high price of bread. The following day he was made aware of the full import of his police responsibilities, when his orders and Lafayette's were impotent to prevent the murders of Foulon and Berthier. This horrible and bloody day was an object lesson for philosopher-revolutionaries. When the dripping heart of Berthier was brought back into the chambers of the Hôtel de Ville only a few minutes after Bailly had ordered his safe-conduct through the city, "nous avons détourné la vue."[39] Then the mob wanted to present Berthier's head to the municipal officials. The doors were ordered barred, and the assembly hastily found other business to discuss.

> Alors, et dans ces moments terribles, il fallait prendre des prétextes pour se refuser à ces atrocités; il y avait un danger réel, et qu'il était inutile de braver, à faire parler le langage de la justice et de l'humanité. Le peuple forcené ne pouvait pas l'entendre; quiconque ne pensait pas comme lui était suspect de trahison.[40]
>
> Quelle magistrature que celle qui n'a pas l'autorité d'empêcher le crime commis sous ses yeux![41]

Bailly learned rapidly that the only way to cope with the fury of the mob was to avoid it. The same day that Foulon and Berthier died he saved de Crosne by giving him asylum in his own house, and he personally escorted him out of Paris the next day. Bailly had come a long way since the day when he believed that "lorsque dans un siècle de lumières on appelle la raison à son aide, la raison doit finir par être la maitresse."

Bailly was more successful in coping with the threat to Dussaulx in October, 1789. Dussaulx had sought to calm a mob in the Place de Grève. "Messieurs," he said, "vous voyez devant vous le traducteur de Juvénal. . . . " The crowd replied with cries of "Qu'est-ce que ce Juvénal? un aristocrate! à la lanterne M. Juvénal!" and were about to make off with the elderly academician, when Bailly intervened and said firmly, "Dussaulx est mon ami; je vous le réclame."[42] It was in gratitude for this act that Dussaulx later offered financial assistance to Mme Bailly after her husband's death.

After the fifth of October there was a balance of power which was maintained almost throughout the duration of the first National Assembly and in which Bailly potentially held a key position. There were four forces involved: the Assembly itself, the Club Breton (later Club des Jacobins), the municipal government of Paris, and the National Guard. In general the Assembly and the Jacobins were allied against the municipality and the popular troops. But Bailly was mayor of Paris and, in theory at least, Lafayette's superior, and he retained his seat in the Assembly and participated in Jacobin affairs.[43] If he was incapable of bringing these different elements together, he was none the less well placed to monitor their activities. His mistake, politically speaking, was in withdrawing from the Jacobins.[44] Later, when Pétion was mayor and Santerre commander of the guard, there arose a formidable coalition of Assembly, city, club, and soldiers which made possible the great power of Robespierre and the Committee of Public Safety. Bailly was unfortunately not the man to bring about such a coalition, and from 1789 to 1791 he concentrated his attention on the mayoralty to the detriment of his prestige and power in the other organizations.

Bailly undoubtedly did a good job as mayor of Paris.[45] He was re-elected in August, 1790, for a

[37] Louis-Dominique Ethis de Corny (1738–1790), lawyer, writer, friend of Voltaire, had agitated for the assembly of the Estates General without distinction of order. He was respected by both the government and the revolutionists and worked hard to maintain some semblance of order in Paris during the events of July 1789.

[38] *Mémoires* **2**: 26.

[39] *Ibid.* **2**: 123.

[40] *Ibid.* **2**: 123.

[41] *Ibid.* **2**: 125.

[42] Berville, xxi–xxii.

[43] We do not know at what period Bailly joined the Jacobins, but his name figures in the list of members published December 21, 1790. About the same date he began to be attacked by the other members, especially Danton. See Aulard, *La Société des Jacobins, passim.*

[44] Bailly officially withdrew from the Jacobins after the affair of the Champ de Mars (*circa* July 1791) to found the Club des Feuillants with Lafayette, the Lameths and the Duc de la Rochefoucauld. Little by little this club gained a reputation as a refuge for reactionaries. The Club des Feuillants was the outgrowth of an earlier group, the Société or Club de 1789, which had a less pronounced political color. Its members included Mirabeau, Lafayette, André Chénier, Condorcet, Marmontel, etc. Bailly served briefly as its president. See Challamel, *Les Clubs contre-révolutionnaires.*

[45] A detailed study of Bailly's mayoralty is to be found in Brucker, *Jean-Sylvain Bailly, revolutionary mayor of Paris,* Urbana, Univ. of Illinois Press, 1950.

second term, defeating Danton by a vote of 12,550 to 1,460. His defeat the following year was, as it were, of his own making, and when he left office the city was in a materially better position than at any time since the outbreak of the Revolution. His preoccupations as mayor were these: to organize an effective machine of government, to stop the famine, to provide work for the idle, to ease the prison situation, to implement the Assembly's decisions concerning the clergy, and to suppress a mounting wave of crime and lawlessness.

An assembly of the representatives of the Paris communes was convened July 25, 1789, ostensibly to draw up plans for a permanent municipal government. Five days later, the Electoral Assembly, which had been exercising the authority of the municipality, was disbanded. The new assembly was a source of much annoyance to Bailly, as it constantly tried to govern, leaving the long-range planning to a committee of twenty-five. The committee did not get on with its work; it remained in session until October, 1790; and its plan, when finished, was disappointing, as it envisaged a top-heavy bureaucracy and severe limitations on the executive power of the mayor. Bailly criticized this plan in two *Observations*[46] which asked for a smaller administration with greater latitude of action. "Il faut que le conseil soit le principe de la force, le maire celui de l'unité des opérations."[47] Bailly never got the type of government he wanted, and for two years he met each problem and each new crisis with an *ad hoc* arrangement. In an eloquent address before the city council on November 12, 1791, Bailly condemned this system of government by expedient, which he attributed to the spread of republican ideas. The planners, long used to the abuse of power in a few hands, were now afraid to delegate authority. Bailly asked that his successor be accorded real powers to match his very real responsibilities—powers which implied no repudiation of the principle of representative government. "Ce principe n'exige ni des assemblées nombreuses ni des pouvoirs trop divisés."[48] Bailly had learned that deliberation was not always the way to achieve action.

On the score of provisioning Paris, Bailly's administration had rather more success. It has been suggested that there was a concerted effort made by the Orleanists to produce an artificial scarcity, particularly in the early days of the Revolution.[49] In 1790 Bailly conferred with Louis XVI on this subject and is reported to have said, "Je ne lui dissimulai pas que la disette avait été plus ou moins factice. . . ."[50] It is a fact that many shipments of grain and flour were waylaid and pillaged before they reached the city, and this created a panic each time it happened.[51] The municipality undertook to buy and sell such provisions itself, convoying the shipments with armed guards and distributing them under the closest supervision. By the time of Bailly's resignation, he was able to announce that Paris had in its storehouses over a year's supply of wood, nearly two years' supply of coal, and sufficient flour to last until the next harvest.

Bailly was responsible for the establishment of numerous *ateliers de charité* or public workhouses, designed to relieve the unemployment which resulted from France's acute economic disorder and was made doubly dangerous by the political events of the Revolution. Limited funds prompted the Assembly of the Communes and the National Assembly to several attempts to suppress the *ateliers,* but Bailly was insistent that the government should not expose itself to the menace of a hungry mob. However, he was careful to avoid an outright system of dole, and much of his energy was directed to the problem of finding legitimate work for idle hands. In this connection it may be observed that Bailly was now in a position to practice and did in fact practice some of the economic theories which he had expounded as early as 1767 in the *Eloge de Charles V.* Particularly he had praised Charles' administrative economy coupled with realistic expenditure in the public welfare: "dans des temps orageux, il faut des secours prompts."[52] Bailly watched the budget like a hawk, but he was always ready to use public funds to alleviate distress and to encourage a normal economy.[53]

The whole period of the Revolution was marked by maladministration of the courts and the prisons, and one of Bailly's principal crusades was the hastening of justice and the amelioration of the lot of the prisoner. In an address to the National Assembly on November 18, 1790, Bailly laid before that body a report on the Paris prisons which, in its reasonableness and humaneness, is reminiscent of the report on the hospitals:

> Les tribunaux sont vacants; les accusés n'ont point de juges. Déjà un mois et plus s'est écoulé; il s'écoulera encore plus de temps avant que les tribunaux nouveaux soient établis, et cependant les prisons sont remplies; de nouvelles prisons y ont été ajoutées, et cependant les prisonniers y sont entassés. L'innocent y attend sa justification, le criminel la fin de ses remords. Tous y respirent un air malsain, et la maladie est près d'y prononcer des arrêts de mort. Le désespoir y dit: Ou donnez-moi la mort ou jugez-moi.[54]

A recent historian has observed that Bailly, despite his professed devotion to the law, was "none too scrupulous" in his observance of judicial codes and the

[46] The *Observations* were published for the first time in DISC MEM **1**: 442–454.

[47] DISC MEM **1**: 452.

[48] *Recueil,* 168.

[49] Montjoie, *Histoire de la conjuration de Louis-Philippe d'Orléans* **1**: 153–193, 228–237, 283–291; **2**: 23–43, 306–312, 345–348.

[50] Sérieys and André, *Anecdotes inédites,* 40.

[51] Defresne, *Les Subsistances, passim.*

[52] DISC MEM **1**: 18.

[53] Brucker, 58–59.

[54] "Discours à l'Assemblée nationale, le 18 novembre 1790."

laws protecting the individual.[55] It is true that Bailly did interfere arbitrarily in several cases, which may be excused only on the grounds of political expediency, but usually this interference was the only alternative to mob violence which Bailly feared and hated. At any time during his mayoralty he would have been happy to renounce all participation in judicial affairs in favor of an efficient court system functioning under clearly defined laws.

One of Bailly's most trying tasks was the implementation of the Assembly's decisions concerning the *constitution civile* of the clergy. An enactment of July, 1790, forbade the clergy to recognize any foreign authority and made nomination to ecclesiastical office a state matter. This law was accepted by the King and, tacitly, by the clergy. It was followed, however, by a law of November 27 which called upon all members of the clergy to swear an oath of obedience to the state and to the civil constitution; those who did not swear were to be regarded as having automatically resigned their offices. The refusal of the overwhelming majority of the clergy caused a deep rift among the revolutionaries themselves and all but suspended the functions of the church in many areas. Bailly, who had never displayed strong feelings one way or the other on church matters, was reluctant to enforce the letter of the law. When the municipality posted its decree implementing the Assembly's law, some overly enthusiastic clerk had caused to be inserted the warning that "les ecclésiastiques qui ne prêteront pas le serment seront regardés comme perturbateurs du repos public."[56] Bailly hastened to denounce this clause: "J'ai été frappé, affligé quand j'en ai vu le préambule. . . . "[57] Six months later a test of the law occurred when a mob attacked a non-conformist priest at the monastery of the Théatins. A battalion of the National Guard protected the priest and dispersed the mob. In a letter of commendation to the commanding officer, Bailly expressed the most liberal views on the freedom of worship:

> . . . la doctrine est la même et chez les prêtres soumis à la loi qui ont prêté le serment et chez ceux qui, par conscience ou par d'autres motifs moins louables, ont cru devoir s'y refuser. Ce point, prétendu de conscience, n'est que pour eux; il ne fait rien à personne; il n'intéresse point le peuple. . . . L'Assemblée nationale a décrété que les opinions seraient libres, que tous les cultes seraient permis. . . . Où est donc leur liberté si vous restreignez et leurs dogmes et leurs actes religieux?[58]

A number of pamphlets made Bailly out as an apostate, and Barruel claims that Bailly said that, if it depended on him, the Catholic religion would be annihilated in France.[59] Such views seem entirely out of keeping with Bailly's character and are certainly contrary to the evidence of his actions and his official utterances.

It was in the matter of policing Paris that Bailly enjoyed least success and encountered greatest criticism. The Revolution produced a widespread amorality which manifested itself in increased prostitution, gambling, pornography, and all manner of petty vice.[60] In vain Bailly tried to close the gaming houses, suppress bullfighting, segregate the prostitutes. He gained only the reputation for being puritanical. He was obliged to re-establish substantially the same police measures that had been used by Sartine, Le Noir, and de Crosne, but they were ineffective without the same financial resources, the same espionage and the same *lettres de cachet*.[61] When Bailly tried to stem the tide of pornographic literature by controlling retail sales, he was accused of interfering with freedom of the press:

> Depuis quelque temps, l'enthousiasme était déjà bien diminué pour M. Bailly. Aujourd'hui c'est un mécontentement presque général, peut-être sans beaucoup de fondement. On l'accuse de vouloir rétablir l'ancien régime de la police, surtout parce qu'il a borné comme autrefois le nombre des colporteurs à trois cents. Bien du monde, et les brochuriers particulièrement, regardent cela comme un attentat à la liberté de la presse.[62]

Bailly's detractors probably greatly exaggerated the dangers of his policy; even after his administration had suffered repeated attacks in the press and he had become a target for personal abuse, Bailly still championed freedom of the press, "qui défend la liberté publique."[63] Nevertheless, such measures began to destroy Bailly's popularity even during his first year in office, because they looked too much like old fetters to a populace bent on license.

The reason for Bailly's decline in popularity is fairly simple. Hébert saw it clearly at the time of Bailly's trial: "Je citerai un mot remarquable de Vergniaud: c'est qu'en révolution il ne faut jamais stationner; un pas rétrograde perdrait infailliblement le parti qui aurait molli."[64] After the civil constitution of the clergy, the King began to be lukewarm to the Revolution, and Bailly, still attached strongly to the monarchy, filled with apprehension at the republican ideas that were beginning to be bruited about, stood still. Everywhere he saw only lawlessness and irresponsibility. His secession from the Jacobins was a protest against the excesses of the Revolution, but it made him automatically a counter-revolutionary. The monarchists, however, would have nothing to do with him, regarding him as a traitor of the blackest sort. Even the King lost faith in his good intentions, received him coolly and on one occasion slammed the door in his face. Bailly's only hope was in the Constitution. Somehow,

[55] Brucker, 63.
[56] *Avant-Moniteur,* Appendix LXXIX.
[57] *Ibid.*
[58] "Lettre à M. Le Feuvre d'Arles, 5 juin 1791."
[59] *History of the clergy* **1**: 72.
[60] *Cf.* Goncourt, 21–27 and 221–236.
[61] Mérard de Saint-Just, 95–96.
[62] Lescure **2**: 412.
[63] *Recueil,* 185.
[64] Aulard **5**: 508.

he was sure, stability must inevitably be re-established through constitutional government. The affair at the Théatins offered Bailly an opportunity for a lengthy public statement of this view in June, 1791.

> Vous êtres libres et vous voulez être heureux; vous ne pouvez être heureux et libres que par la loi; toute infraction à la loi est une atteinte à votre liberté. On vous parle de despotisme; il n'y en a plus. Vous avez un roi que vous chérissez; il règne par la constitution; il cède le premier à la loi qu'il doit faire exécuter . . . ; bannissez donc les défiances; faites cesser la fermentation et des assemblées et des groupes motionnaires, les attroupements, les mouvements populaires, et tous ces désordres qui effrayent les bons citoyens, éloignent les riches, dépeuplent la capitale, aggravent la misère; et, en rétablissant la paix et l'ordre public, finissons par la sagesse une révolution que vous avez si heureusement commencée par le courage.[65]

A month later, forced by circumstance to act, he took the fatal "pas rétrograde" at the Champ de Mars.

The King's flight to Varennes at the end of June, 1791, accelerated the movement towards republican government, even among the moderates. In the middle of July the Jacobins drafted a petition for the deposition of the King and the establishment of a republic. As the Assembly had shown itself inhospitable to such petitions, it was proposed to have this one signed at a mass meeting at the *autel de la patrie* on the Champ de Mars. The date was set for July 17. The day before, the National Assembly, fearing a popular uprising, ordered Bailly and Lafayette to use force if necessary to maintain order. Two killings on the morning of the seventeenth were the pretext for the declaration of martial law. Bailly and Lafayette together led the troops that marched on the Champ de Mars in the late afternoon to disperse the crowd. They were stoned and, according to some sources, fired on. The troops returned the fire, and some ten or fifteen persons were killed. The following day Bailly made a full report of the affair to the Assembly and was commended for his resolute action. It was not until Bailly was out of office that his enemies began to suggest that he was in any way at fault for the events of that day.[66] Nevertheless, Bailly realized that the last vestige of his popularity was gone and that he was no longer an effective voice in the Revolution. Three months later he tendered his resignation to the municipality in a letter which is singularly dispirited and significant for its lack of revolutionary eloquence:

> Je crois que je puis regarder ma carrière comme finie. Je viens vous prier de recevoir ma démission. La constitution est achevée, solennellement décrétée; elle est acceptée par le roi. Commencée sous ma présidence, j'ai dû la voir terminer, et accomplir mon serment. Mais j'ai besoin d'un repos que les fonctions de ma place ne me permettent pas. . . .[67]

Bailly was asked to postpone his departure until new elections could be arranged, but no one protested his resignation, and the following month Pétion succeeded to the mayoralty to the general relief of all concerned.

Bailly's ostentation as mayor was frequently criticized by his friends as well as his enemies. Mérard de Saint-Just has left us an account of the great display with which Bailly rivalled royalty:

> Il souffrit que la commune arrêtât que ses gens porteraient une livrée; et cette livrée fit crier avec raison, car elle était plus voyante que celle du roi. . . . Il aimait la grande représentation de sa place, son nombreux domestique, son carrosse précédé de deux ordonnances, à voir prendre les armes quand il sortait ou rentrait dans son hôtel, l'affluence du monde qui avait des rapports habituels à lui, les audiences publiques qu'il donnait, les députations de tous les corps de l'état, de toutes les autorités constituées, qui lui témoignaient les plus grands égards. . . . Il entrait chez lui . . . précédé d'un laquais [qui] prononçait ces mots: Monsieur le Maire! . . . On m'a demandé souvent pourquoi à la mairie on parodiait Versailles; et je n'ai su que répondre.[68]

Yet Bailly was an honest man who put the general interest above personal gain. If he felt the weight of his office a little too keenly, it was because, on the one hand, he was conditioned by the traditional pomp of the *ancien régime* and because, on the other, he believed that under popular government the man raised to high office should serve as a visible symbol of authority. Bailly explained that he continued to wear the uniform of the Estates General long after that custom had been abandoned by others, because "un député inviolable, un législateur, est un objet de vénération publique et qu'il est bon d'annoncer et de faire connaître partout par un signe extérieur." [69]

It was a combination of reason and pride, of nobility and incapacity, of tenacity and improvidence which, while Bailly and his fellow constitutionalists worked for the regeneration of the monarchy, actually debilitated and destroyed it. Bailly was prepared to make changes without quite knowing their nature or their possible effect. He was determined to preserve the monarchy even as he undermined it; he resisted republicanism even as he prepared the way for it. This is why Nourrisson called him "excellement un révolutionnaire . . . le révolutionnaire sans le savoir." [70] Yet Bailly matured during his two years in the service of the Revolution, and

[65] "Lettre à M. Le Feuvre d'Arles, 5 juin 1791." That Bailly wanted this letter to be published is shown clearly by his concluding remarks: "Voilà, monsieur, ce que je désirerais pouvoir dire à mes concitoyens; . . . vous êtes le maître de donner à cette lettre la publicité que vous jugerez convenable."

[66] Even Danton, who repeatedly attacked Bailly, first alluded to the affair of the Champ de Mars only in July, 1792, a year after the event. (Danton, 152.)

[67] "Lettre aux officiers municipaux, 19 octobre 1791."

[68] *Op. cit.*, 103–104.

[69] *Mémoires* **1**: 69.

[70] *Op. cit.*, 334.

when he retired from office he had lost many of his illusions about reason and law. Human law, unlike natural law, was violable, and the grand order was not, after all, to be the work of pure reason:

> Citoyens, vous vous plaignez du défaut de l'ordre public, mais rappelez-vous qu'on a administré dans les temps orageux d'une révolution. Combien de règlements nécessaires ont été suspendus, parce qu'ils n'auraient pas été exécutés; combien de mesures sages ont été retirées, combien de fois on n'a pas commandé, assuré de n'être pas obéi. . . . Quand on ne peut opposer que la loi aux désordres, il est incertain qu'on puisse les réprimer; il est sûr qu'on a rarement le moyen de les prévenir.[71]

Hindsight is profitless, but no disgrace. Bailly's slow awakening to the brutal realities of the Revolution was shared by many of his more astute contemporaries.

Bailly retired into what he hoped would be obscurity. Very briefly he served with the administration of the Département de Paris, but at the beginning of 1792 he seems to have been at Chaillot working on his *Mémoires*. The attacks on Bailly and Lafayette began to multiply in the spring of that year.[72] In June Bailly sold the house at Chaillot and began to travel in the provinces. Ultimately he settled at Nantes. After the formation of the Convention in September, Bailly was placed under police surveillance as a dangerous reactionary and was obliged to report weekly to the Procureur-Syndic at Nantes. His quarters at the Louvre were confiscated. The Paris Municipal Council imposed on him a fine for the supposed misuse of public funds, and Bailly was forced to sell part of his library in order to pay the required 6,000 livres.[73] On October 25, Renaudin, in a session of the Jacobin club, demanded Bailly's head to pay for his "crimes."[74] With the suspension of the King and the massacres in the Paris prisons, it must have become apparent to Bailly that his life was in danger. It is probably about this period that the Marquis de Casaux proposed his emigration to England or America.[75] Bailly refused to leave France, feeling that he had no reason to apologize for his conduct and that his departure would be construed as an admission of guilt. The execution of the King, the formation of the Committee of Public Safety, the fall of the Girondins, and the outbreak of the Vendéan war, however, made his situation still more perilous. Perhaps in order to avoid any suspicion of collusion with the rebels, Bailly determined in July, 1793, to leave Nantes. Laplace offered him asylum at Melun, near Paris. Two days after his arrival Bailly was placed under house arrest. Tarbé des Sablons, the local mayor, was kindly disposed towards him and evidently hoped that Bailly would take warning and escape while there was still time. In September, however, on the orders of the Committee of Public Safety, Bailly was imprisoned and transferred to Paris to the Madelonnettes, then to La Force, and finally to the Conciergerie. Ostensibly he was called as a witness in the trial of the Queen, but it was immediately apparent that he was himself on trial, for most of the questions put to him concerned the Champ de Mars, his relations with Lafayette and his activities in the political clubs.[76] The accusation of Marie Antoinette announced as proven that Bailly had participated in a plot for the flight of the royal family, although there was no evidence to this effect. Realizing the nature of the charges against him and the impossibility of obtaining any help from outside, Bailly devoted his last days in prison to the composition of a justificatory document entitled *J.-S. Bailly à ses concitoyens,* in which he reaffirmed his faith in and obedience to the law. "Comment, des magistrats seraient poursuivis pour avoir exécuté la loi? et quel est l'homme qui osera être magistrat? quels risques ne courrez-vous pas vous-mêmes, mes chers concitoyens?"[77]

Bailly's trial was a brief affair on November 11. On the thinnest tissue of evidence he was found guilty of conspiracy with Louis Capet, his wife, "et autres" to disturb the peace, excite civil war, and attack the liberty of the people, the consequence of which conspiracy was the massacre "d'un nombre considérable de citoyens."[78] Bailly was sentenced to death. In a morbid desire for vengeance, the court ordered that the execution take place, contrary to custom, on the Champ de Mars and that the red flag—the symbol of martial law—be carried with the prisoner and burned at his execution. Bailly's death was one of the cruelest legal killings of the Revolution. He was exposed to every indignity, and his suffering was prolonged while the guillotine was dismounted and reassembled in a muddy ditch, because the mob refused to profane the hallowed ground of the Champ de Mars.[79] It was a cold and rainy day, and there is a time-honored anecdote that when Bailly shivered one of the spectators

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[71] *Recueil,* 183.

[72] *Cf.* Danton, 143 ff. and Aulard **3**: 515 ff.

[73] Mérard de Saint-Just, 137–138. By his own account, Bailly had at this date an annual income of 3,490 livres, partially from annuities purchased before the Revolution, partially from investments left him by his parents. At the time of his death, he had still not received payment for the sale of his house at Chaillot. ("J.-S. Bailly à ses concitoyens" in *Mémoires* **1**: 409.)

[74] Aulard **4**: 425–426.

[75] Mérard de Saint-Just, 136. Faÿ, "L'Amérique au XVIII[e] siècle . . . ," 399, says that Bailly had invested money in the Castorland project in upper New York State. Bailly himself mentions that flight to England had been proposed to him when he was at Le Havre in December, 1791.

[76] *Acte d'accusation de Marie-Antoinette.*

[77] *Mémoires* **1**: 410.

[78] France, Tribunal Révolutionnaire, *Suite de Jugemens 1–30 Brumaire An II,* 22.

[79] Vacquier, "Lieu de décapitation de Bailly. . . ."

taunted him with "Tu trembles, Bailly," to which Bailly replied, "J'ai froid, mon ami."[80] Thus, on November 12, 1793, Bailly joined the ranks of the aristocracy, the meddlers, the liberals, the scapegoats, and the innocents whose deaths marked the beginning of the Terror—the Girondins, Orléans, Marie-Antoinette, Mme Roland, General Biron, la du Barry *et al.* He died "avec le calme d'un des premiers philosophes de l'Europe." [81] In the peace and quiet of his study at Chaillot, which he could see from his place of execution, Bailly had some years earlier written these prophetic lines which, taken literally as a political doctrine, might have spared him and many of his contemporaries:

> Ne souhaitons jamais de révolution; plaignons nos pères de celles qu'il ont éprouvées. Le bien dans la nature physique et morale ne descend du ciel sur nous que lentement, peu à peu, j'ai presque dit goutte à goutte; mais tout ce qui est subit, instantané, tout ce qui est révolution, est une source des maux.[82]

[80] The source seems to be Riouffe, *Mémoires d'un détenu*, 50–51. Mérard de Saint-Just, 192, gives another version: "Un autre misérable . . . lui avait demandé un instant avant s'il b..dait. Il lui avait répondu, le souris sur les lèvres: Non."

[81] Riouffe, 51.

[82] ATLAN, 21.

CONCLUSION

After so detailed an account it is appropriate to consider Bailly's place in eighteenth-century thought. Taine held in *Les Origines de la France contemporaine* that the Revolution was a consequence of French classicism, with its exaggerated confidence in the value of reason. Paradoxically, that confidence became, in course, an unreasonable fetich. In this sense, Freemasonry, illuminism, mesmerism, and other semi-mystic manifestations were not so much reactions to rationalism as an extension of it. Bailly was a consistent rationalist when he substituted *vraisemblance* for *la vérité inaccessible*. The urge to demonstrate and the will to believe the undemonstrable were both characteristic of the eighteenth century; Bailly was a good example of this rule. We have seen that Bailly was not an original thinker, but there is indeed nothing new under the sun, and not all merit lies in originality. Bailly was a synthesist, and the end result of his work differed, therefore, from the bits and pieces of borrowed philosophy which went into its composition.

The first and most important influence on Bailly's thought was Newtonian physics. From his first studies with Montcarville to the last page of the history of Indian astronomy, Bailly proved his ability as an astronomer and mathematician and repeatedly affirmed his conviction that natural phenomena could be explained by essentially simple physical laws. He was not merely an observer, and, in astronomy at least, he was not satisfied with empirical evidence. He regarded mathematics and particularly the advances in mathematics made by Descartes, Newton, and Leibnitz as one of the triumphs of modern civilization and the instrument by which the secrets of Nature could be wrested from her. He learned always to accept the simpler of two possible explanations and the explanation which was applicable to more than one phenomenon. This basically scientific procedure was to characterize all his later non-scientific thinking.

When, after nearly a decade of application to physical studies, Bailly began to examine the metaphysical philosophy of Leibnitz, he was prepared to believe that scientific precision could be extended to other fields of human knowledge—history, law, language, etc. It was here that he parted company with the skeptical philosophers, who distrusted systematic explanations of immaterial or intangible phenomena. Like Leibnitz (and like Descartes), Bailly fell victim to the hobgoblin of *vraisemblance*. Where truth was undemonstrable he was prepared to accept the likely, the probable explanation. He proceeded too rapidly from the known into the unknown, projecting hypothetical straight lines where a devious course would have been more in order.

From Leibnitz and from Voltaire Bailly learned a new philosophy of history. History was no longer a mere object of curiosity and the chronicling of superficial fact, but a deep source of knowledge and understanding. As he agreed with the *philosophes* on the didactic purposes of art, so Bailly agreed with them on the didactic purposes of the study of history, which taught a twofold lesson by good precepts and bad examples. Latent in it were universal and enduring physical truths which documented the progress of man from the time of his creation. But in his study of history, Bailly applied the touchstone of simplicity. As in astronomy, he sought the simpler of two explanations and the explanation which would cover more than one fact. This meant generalization and oversimplification.

At this juncture in his development, Bailly came under the influence of Court de Gébelin who was traveling in the same general direction. For a few years they worked separately, but along parallel lines, on the interpretation of myth and allegory, in search of a sure key to the past. Bailly's history, like Court de Gébelin's, is the history of humanity rather than of men, of universal laws rather than of specific events. Like Court de Gébelin, Bailly thought he saw at the beginning *Order* and *Truth*, a sublime philosophy and a universal language, documenting the philosophers' arguments for the fraternity of man. The eighteenth century was blessed by the rediscovery of these lost truths, and the renascence of the golden age was at hand. There was a fundamental contradiction implicit in Bailly's belief in progress and his devotion to the cause of antiquity. It was, in a sense, the same conflict which existed between his precise Newtonian doctrines and his "esprit de système." He found these contradictions resolved in Freemasonry. Whatever their motives, Voltaire and Franklin had, by joining the order, given it the stamp of approval of the *philosophes*, and Court de Gébelin had found in it the unity and sublimity of the *grand ordre*. There can be no doubt that Bailly regarded Freemasonry as the resurrection of the guiding principles of the past.

If Bailly differed from the point of view of the *philosophes*, it was perhaps more in temperament than in doctrine. He was neither a skeptic nor an iconoclast. He was conservative in thought as well as deed; he was, until the Revolution, obedient to the monarchy and discreet in his dealings with the church. When he turned to reform, it was the reform sanctioned by authority. It was for these reasons that he was closer to Buffon than to d'Alembert. It would be a gross underestimation of Bailly to conclude that he was spurned by the *philosophes* because he was incapable of straight thinking. His association with Franklin in the investigation of animal magnetism and his exhaustive reports on the hospitals quickly dispel any such illusions. Nor can we say that it was solely the in-

fluence of Franklin or of anyone else that brought him back from his vain rambles among the ancients. In the *Essai sur les fables* there was a turning point in his thought or, more correctly, an increasing maturity. He began to be aware of the exceedingly complex nature of human activity, and, although he never lost track of his cosmic principles, his later judgments were more sober. Even the Indian astronomy, ill-conceived and largely inferred though it was, was nevertheless based on scientific methods, and its errors are errors of degree, not of order. Perhaps the discovery and publication of Bailly's unfinished manuscripts will some day permit us to trace further this evolution of his thought.

Whereas, in the period before the Revolution, Bailly's life was almost synonymous with his works, after April 1789, his sudden emergence as a public figure shifts the emphasis from words to deeds. We have dealt superficially with these years, partly because they lie beyond the formative period of his thought, partly because they are well documented elsewhere. However, the Revolution represented the acid test of Bailly's philosophizing; it was the moment that every theorist waits for, the moment when he can try the practical application of his ideas. Bailly's ideas did not survive the test for the very reason that they were too diffuse, too general, too simple. Reason did not engender reason, and, while Bailly thought in terms of civic obedience, the mob outside was committing murder and worse. The remarkable aspect of Bailly's public life is not his failure, but the fact that he succeeded so well in coping with the practical problems which were so far removed from his cognizance.

There is a wide field yet to be explored in connection with Bailly's influence on his contemporaries and on the generation immediately following. Dimoff has written a detailed and penetrating account of Chénier's indebtedness to Bailly. Similar studies might be done on Shelley, de Maistre, Mme de Staël and possibly Napoleon. We have the testimony of Mary Shelley that the English poet had read and admired Bailly. De Maistre perhaps based his theory of the degradation of man on some of Bailly's historical research. Mme de Staël, who disapproved of Bailly the revolutionary, may owe to Bailly the historian her notions of the "facultés primitives émoussées" which figure in *De l'Allemagne*. One of Bailly's biographers, Lefèvre-Deumier, claimed that Napoleon ordered the assembling of Bailly's manuscripts and a handsome collected edition of his works. Indeed, the evidence seems to be that Bailly's influence did not die out with the Revolution, but carried on well into the Romantic period. Furthermore, the number of translations of Bailly's works suggests a certain influence abroad, especially in Germany.

If this influence has disappeared today, it is because we have, to a considerable extent, emerged from the era of philosophic systems which, in attempting to explain too much, explain very little. Scientists and historians, better equipped with factual knowledge, are increasingly reluctant to generalize their findings in cosmic formulæ. Yet there is still what Franklin called "a wonderful deal of credulity in the world," and Bailly, who certainly regarded himself as an enemy of superstition, may none the less serve as an object lesson in the subtle dangers of rationalism.

> Un mensonge vieillit; il devient ennuyeux.
> Il prend une autre forme et reparaît aux yeux.
> Pensant le fuir, trompés à sa ruse infidèle,
> Nous courons l'embrasser sous sa forme nouvelle.
> Nous quittons un prestige, une vaine fureur,
> Non pour la vérité, mais pour une autre erreur.
>
> André Chénier, "Epître à Bailly."

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PART I. BAILLY, AUTHOR AND EDITOR

Part I is intended to be a comprehensive checklist of Bailly's printed works. It is arranged in three groups: major works (books and articles), translations, and official speeches and letters relating to Bailly's role in the Revolution. The items are listed within each group in a generally chronological order, determined by date of publication or, in the case of academic papers, the year in which they were read. Items published separately are fully described as to title page, pagination, plates, etc. Those which the author has been unable to examine personally are preceded by an asterisk. The descriptions of such starred items have been copied from the sources indicated in parentheses. Entries in Part I have been numbered for convenience in cross reference.

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*37 —— Paris, V^ve^ Hérissant, 1784. 8°. (Quérard.)

38 EXPOSÉ/DES EXPÉRIENCES/QUI ONT ÉTÉ FAITES POUR L'EXAMEN/DU MAGNÉTISME ANIMAL./Lû à l'Académie des Sciences, par M. BAILLY,/ en son nom & au nom de Mrs. FRANKLIN,/LE ROY, DE BORY & LAVOISIER,/le 4 Septembre 1784./Imprimé par ordre du Roi./(ornament)/A PARIS,/DE L'IMPRIMERIE ROYALE./——/M.DCCLXXXIV./ 15 p. 4°.

*39 EXPOSÉ/DES EXPÉRIENCES/QUI ONT ÉTÉ FAITES POUR L'EXAMEN/DU MAGNÉTISME ANIMAL./Lû à l'Académie des Sciences, par M. BAILLY,/en son nom & au nom de Mrs. FRANKLIN,/LE ROY, DE BORY & LAVOISIER,/le 4 Septembre 1784./Imprimé par ordre du Roi,/Sur la Copie imprimée au Louvre./A Paris,/Chez Moutard, Imprimeur-Libraire de la Reine/& de l'Académie Royale des Sciences, Hôtel de/Cluni, rue des Mathurins./M.DCC.LXXXIV./ [2], 15 p. 8°. (Ford, *Franklin Bibliography*.)

*40 Eloge de Gresset. Genève, Barde, Manget et Cie., 1785. 8°. (Bibliothèque Nationale.)

41 HISTOIRE/DE/L'ASTRONOMIE MODERNE/DEPUIS LA FONDATION/DE L'ÉCOLE D'ALEXANDRIE,/JUSQU'A L'ÉPOQUE DE M.D.CC.XXX./Par M. BAILLY, Garde honoraire des Tableaux du Roi, de l'Académie/Françoise, de l'Académie royale des Inscriptions & Belles-Lettres,/& de celle des Sciences, de l'Institut de Bologne, des Académies/de Stockholm, de Harlem & de Padouë, & de la Société des Antiquités/de Cassel./NOUVELLE ÉDITION./——/Magni animi res fuit rerum naturae latebras dimovere, nec contentum/exteriori ejus conspectu introspicere, & in Deorum secreta descendere./Seneca, Quaest. nat. Lib. VI, c. 5./——/TOME PREMIER./(ornament)/A PARIS,/Chez DE BURE, Quai des Augustins, près la rue Pavée./——/ M.D.CC.LXXXV./AVEC APPROBATION ET PRIVILÈGE DU ROI./ 3 v., pl. 4°. Vol. 1: xvi, 728 p. 13 pl. Vol. 2: /TOME SECOND/ 751 p. 5 pl. Vol. 3: /JUSQU'A L'ÉPOQUE DE M.D.CC.LXXXII./. . ./TOME TROISIEME/ 415 p. Table générale: pp. 345–414. Despite the new title page and the indication "nouvelle édition," this is simply a reprint of numbers 31 and 33 above.

42 EXTRAIT/DES REGISTRES/DE/L'ACADÉMIE ROYALE DES SCIENCES./Du 22 Novembre 1786./RAPPORT/Des Commissaires chargés, par l'Académie, de l'examen/du Projet d'un nouvel Hôtel-Dieu./——/IMPRIMÉ PAR ORDRE DU ROI./——/(ornament)/A PARIS,/DE L'IMPRIMERIE ROYALE./——/M.DCCLXXXVI./ 128, vi p. 1 pl. table. 4°. This is the first report on the hospitals. It was submitted to the Academy September 2, 1786. The text is reprinted in HIST AC SCI 1785 (*sic*): 1–110.

*43 —— Paris, Moutard, 1787. 8°. (Bibliothèque Nationale.)

44 EXTRAIT/DES REGISTRES/DE/L'ACADÉMIE ROYALE DES SCIENCES./Du 20 Juin 1787./RAPPORT/Des Commissaires chargés, par l'académie, des Projets relatifs/à l'établissement des quatre Hôpitaux./——/IMPRIMÉ PAR ORDRE DU ROI./——/(ornament)/A PARIS,/DE L'IMPRIMERIE ROYALE./——/M.DCCLXXXVII./ 15 p. 4°. Reprinted in HIST AC SCI 1786 (*sic*): 1–9.

45 TRAITÉ/DE L'ASTRONOMIE/INDIENNE ET ORIENTALE,/Ouvrage qui peut servir de suite à l'Histoire de l'Astronomie/ancienne./PAR. M. BAILLY, Garde honoraire des Tableaux/du Roi, l'un des quarante de l'Académie françoise,/de l'Académie royale des Inscriptions & Belles-Lettres,/de celle des Sciences, de l'Institut de Bologne, des/Académies de Stockholm, de Harlem & de Padouë,/& de la Société des Antiquités de Cassel./(ornament)/A PARIS,/Chez DEBURE l'aîné, Libraire de la Bibliothèque du Roi & de/l'Académie des Inscriptions & Belles-Lettres, quai des Augustins,/& au mois d'Avril 1787, rue Serpente, Hôtel Ferrand, n°. 6./——/M.DCC.LXXXVII./ 2 p. l., clxxx, 427 p. 4°.

46 EXTRAIT/DES REGISTRES/DE/L'ACADÉMIE ROYALE DES SCIENCES./Du 12 Mars 1788./TROISIÈME RAPPORT/Des Commissaires chargés, par l'Académie, des Projets relatifs/à l'établissement des quatre Hôpitaux./——/IMPRIMÉ PAR ORDRE DU ROI./——/(ornament)/A PARIS,/DE L'IMPRIMERIE ROYALE./——/M.DCCLXXXVIII./ 36, [2] p. 1 pl. 4°. Reprinted in HIST AC SCI 1786 (*sic*): 13–40.

47 Rapport des commissaires chargés par l'Académie de l'examen de différents mémoires sur l'établissement des tueries hors de Paris. HIST AC SCI 1787: 19–43. This report is dated May 3, 1788.

48 DISCOURS/ET/MÉMOIRES,/PAR L'AUTEUR/DE L'HISTOIRE DE L'ASTRONOMIE./TOME PREMIER./——/A PARIS,/Chez DE BURE l'aîné, libraire de la biblio-/thèque du Roi et de l'Académie des belles/lettres, hôtel Ferrand, rue Serpente, no. 6./——/M.DCC.XC./ 2 v. 8°. Vol. 1: 2 p. l., 454 p. Vol. 2: /TOME SECOND/ 2 p. l., 434 p. Contents: Vol. 1: Eloge de Charles V, Eloge de P. Corneille, Notes, Eloge de Molière, Eloge de la Caille, Eloge de Leibnitz, Notes, Eloge de Cook, Eloge de Gresset, Discours de 26 février, 1784, à la réception de Bailly à l'Académie française, Réponses ou Discours que M. Bailly a prononcés, tant comme président de l'assemblée que comme maire. Vol. 2: Rapport sur le magnétisme animal, Exposé des expériences faites sur le magnétisme animal, Lettre à M. Le Roi sur la question . . . de l'imagination, Rapport sur . . . un nouvel Hôtel-Dieu, Second rapport, Troisième rapport, Rapport sur les tueries.

49 PROCÈS-VERBAL/DES/SÉANCES ET DÉLIBÉRATIONS/DE L'ASSEMBLÉE GÉNÉRALE/DES ÉLECTEURS DE PARIS,/Réunis à l'Hôtel-de-Ville le 14 Juillet 1789./RÉDIGÉ/Depuis le 26 Avril jusqu'au 21 Mai 1789,/Par M. BAILLY, des Académies-Françoise, des Inscriptions/et des Sciences, Electeur, et Secrétaire de l'Assemblée/des Electeurs, premier Député de Paris à l'Assemblée Natio-/nale, premier élu Président de cette Assemblée, premier/Maire de Paris;/Et depuis le 22 Mai jusqu'au 30 Juillet 1789,/Par M. DUVEYRIER, Avocat, Electeur et Secrétaire de/l'Assemblée des Electeurs, Député Suppléant à l'As-/semblée Nationale, et l'un des Représentans de la/Commune./TOME PREMIER./A PARIS,/Chez BAUDOIN, Electeur, Député Suppléant de Paris, et/Imprimeur de l'ASSEMBLEE NATIONALE./——/1790./ 3 v. 8°. Vol. 1: xvi, 479 p. Vol. 2: /TOME SECOND/ 536 p. Vol. 3: /TOME TROISIEME/ 386, 17 p.

*50 J.-S. Bailly à ses concitoyens. Paris, impr. de Pain, [1792]. 8°. (Bibliothèque Nationale.) The date ascribed to this item is certainly incorrect. Bailly wrote his defense after the Queen's trial, probably in October, 1793.

51 ESSAI/SUR LES FABLES,/ET SUR LEUR HISTOIRE,/ADRESSÉ A LA CITNE. DU BOCAGE,/Ouvrage posthume de JEAN-SYLVAIN BAILLY,/des ci-devant Académies Française, des Sciences,/des Belles-Lettres, Auteur de l'Histoire de l'As-/tronomie, &c. &c./TOME PREMIER./——/A PARIS,/Chez GUILLAUME DE BURE l'ainé, libraire de/la Bibliothèque Nationale, rue Serpente, no. 6./——/AN VII./ 2 v. 8°. Vol. 1: [4], 302 p. Vol. 2: /TOME SECOND/ 366, [2] p.

52 Rapport secret sur le mesmérisme, rédigé par Bailly. François de Neufchâteau, *Le Conservateur* 1800. **1**: 146–155. On the last page: "Fait à Paris, le 11 août 1784. Signé Franklin, Bory, Lavoisier, Bailly, Majault, Sallin, d'Arcet, Guillotin, Leroi."

53 LETTRES/SUR/L'ATLANTIDE DE PLATON/ET SUR L'ANCIENNE/HISTOIRE DE L'ASIE./Pour servir de suite aux Lettres sur l'origine des sciences,/adressées à M. DE VOLTAIRE par M. BAILLY./NOUVELLE ÉDITION./——/Prix 3 francs 60 cent. broché./——/(ornament)/A PARIS, Chez DE BURE, père et fils, Libraires, rue Serpente, No. 6./——An XIII.—1804./ 2 p.l., 443, [1] p., map. 8°. Despite the fact that the pagination corresponds to number 30 above, this is, in fact, a new edition. Footnotes have been corrected, type and spelling modernized, etc.

54 MÉMOIRES/D'UN TÉMOIN DE LA RÉVOLUTION,/OU/JOURNAL/DES faits qui se sont passés sous ses yeux,/et qui ont préparé et fixé la Constitution/française./OUVRAGE POSTHUME/DE JEAN-SYLVAIN BAILLY,/PREMIER PRÉSIDENT de l'Assemblée nationale consti-/tuante, premier Maire de Paris et membre des Trois/Académies./TOME PREMIER/——/PARIS,/LEVRAULT, SCHOELL ET CNIE., RUE DE SEINE, S.G./——/XII.–1804./ 3 v. 8°. Vol. 1: 335 p. Facing title page: "Se trouve à Strasbourg chez Levrault et Cnie., à Darmstadt à la librairie de la Cour, à Hambourg chez F. Perthès, chez Hoffmann, à Berlin chez Mettra, à Leipsick chez Rein et Cnie., à Francfort chez Esslinger. On a tiré in-folio un petit nombre d'exemplaires de ces Mémoires sous le titre d'*Avant-Moniteur*, pour servir d'introduction au *Moniteur*." Vol. 2: /TOME SECOND/ 388 p. Vol. 3: /TOME TROISIEME/ 374 p., errata. This volume contains "Notes pour mettre à la fin du journal" (242–249) and "Lettres et discours de Bailly pendant ses fonctions de doyen et de président de l'Assemblée nationale et de maire de Paris" (251–374).

55 AVANT-MONITEUR, OU/TABLEAU SOMMAIRE/DES HUITS PREMIERS MOIS DE LA REVOLUTION FRANÇAISE,/PRINCIPALEMENT COMPOSÉ/DES MEMOIRES/DE JEAN-SYLVAIN BAILLY,/DE L'ACADÉMIE DES SCIENCES, PREMIER PRÉSIDENT DE L'ASSEMBLÉE NATIONALE CONSTITUANTE,/ET PREMIER MAIRE DE PARIS./Pouvant servir d'Introduction au Moniteur jusqu'au 24 Novembre 1789,/l'époque où ce journal a commencé./——/PARIS,/LEVRAULT, SCHOELL et Cnie., libraires, rue de Seine, S. G. no. 1395./——/AN XIII. (1805)./ 2 p. l., 2, CLXI, xv p. folio. Edited by A. G. Griffet de la Baume and continued by him from another source from October 3 to November 23. The appendix contains a useful collection of Bailly's official letters and speeches.

56 HISTOIRE/DE/L'ASTRONOMIE/ANCIENNE ET MODERNE/DE J.-S. BAILLY,/Dans laquelle on a conservé littéralement le texte historique/de l'Auteur, en supprimant les détails scientifiques, les/calculs abstraits, les notes hypothétiques, peu utiles à beau-/coup de Lecteurs, et aux Elèves auxquels ce Livre est spé-/cialement destiné./Par V.C. . . ./——/TOME PREMIER./——/A PARIS,/Chez BERNARD, Li-

braire de l'Ecole Poly-/technique et des Ponts et Chaussées, quai des/Augustins, No. 31./——/AN XIII.–1805./ 2 v. 8°. Vol. 1: xlviij, 371 p. Vol. 2: 495 p. Edited by Victor Delpuech de Comeyras.

57 RECUEIL/DE/PIÈCES INTÉRESSANTES/SUR LES ARTS, LES SCIENCES ET LA LITTÉRATURE,/OUVRAGE POSTHUME/DE SYLVAIN BAILLY, PREMIER MAIRE DE PARIS,/PRÉSIDENT DE L'ASSEMBLÉE CONSTITUANTE, MEMBRE DE/L'ACADÉMIE DES SCIENCES, ET DES AUTRES ACADÉMIES/ROYALES,/PRÉCÉDÉ/ DE LA VIE LITTÉRAIRE ET POLITIQUE DE CET/HOMME ILLUSTRE./——/A PARIS,/Chez/FERRA AINÉ, LIBRAIRE, RUE DES GRANDS-/AUGUSTINS, No. 11;/MONGIE JEUNE, LIBRAIRE, PALAIS-ROYAL,/GALERIE DE BOIS, No. 208./——/1810./ lvi, 280 p. 8°. Edited by Cubières (-Palmézeaux). Contents: Vie de Bailly, La vie des peintres allemands, Extraits sur l'Histoire des Mathématiques de Montucla, Réflexions sur les maîtrises des artistes, Exposé de ce que l'Académie a fait et de ce qui lui reste à faire pour la description des arts, Lettre à un savant de ses amis sur l'astronomie, l'Atlantide et les peuples étrangers, Discours sur les prisonniers prononcé le 18 novembre 1790, Discours de remercîment au conseil général de la commune 12 novembre 1791, Recueil de poésies fugitives.

58 MÉMOIRES/DE BAILLY,/AVEC UNE NOTICE SUR LA VIE,/DES NOTES ET DES ÉCLAIRCISSEMENS HISTORIQUES./PAR/MM. BERVILLE ET BARRIÈRE./——/TOME PREMIER./——/PARIS./ BAUDOIN FRÈRES, IMPRIMEURS-LIBRAIRES,RUE DE VAUGIRARD, No. 36./——/1821./ 3 v. 8°. Vol. 1: xxxi, 478 p. Vol. 2: /TOME SECOND/ 449 p. Vol. 3: /TOME TROISIEME/ iv, 436 p. 1822. These three volumes constitute vols. 8–10 of the *Collection des mémoires relatifs à la Révolution française. . . .*

Section 2. Translations

59 Des Herrn Bailly/Aussehers über den königlichen Bildersaal wie auch der kö-/niglichen Akademie der Wissenschaften zu Paris und des/Instituts zu Bologne Mitgliedes./GESCHICHTE/der/STERNKUNDE DES ALTERTHUMS/ bis/auf die Errichtung/der Schule zu Alexandrien./——/ Magni animi res fuit, rerum naturae latebras dimovere, nec/contentum esse exteriori conspectu, introspicere et in deorum/secreta descendere./SENECA. Quaest. nat. L. VI. c. 5/——/Erster Band./——/Leipzig,/im Schwickertschen Verlage./1777./ 2 v. in 1. 8°. Vol. 1: Text. [xii], 334, [i] p. Vol. 2: Eclaircissements. 339, [i] p., 3 pl. The title page of vol. 2 differs from that of vol. 1, as follows: Des Herrn Bailly/GESCHICHTE/der Alten Sternkunde/oder/die Erläuterungen/der Astronomischen Geschichte/des Alterthums./——/Zweiter Band./——/Leipzig,/im Schwickertschen Verlage./1777./ This translation is by Christian Ernst Wünsch (1744–1828), like Bailly, a scientist and historian of science. (*Cf.* his *Gedanken über den Ursprung des Sprachen, Verfassungen, Kunste, Religionen und Wissenschaften,* 1782.) It is dedicated to Abraham Gotthelf Kästner, who was largely responsible for the reformation of natural sciences courses at the University of Göttingen.

*60 Briefe über den Ursprung des Wissenschaften und der asiatischen Völker . . . an den Herrn von Voltaire . . . Voran einige Briefe des Letztern an den Verf. Leipzig, Weygand, 1778. 247 p. 8°. (Deutscher Gesamtkatalog.)

*61 Report/of/Dr. Benjamin Franklin/and other/Commissioners,/charged by the /King of France,/with the Examination of the/Animal Magnestism,/as now practised at Paris./Translated from the French./With an/Historical Introduction./London:/Printed for J. Johnson, (No. 72) St. Paul's/Church-Yard. 1785./ xx, 108 p. 8°. (Ford, *Franklin Bibliography.*)

62 LA STORIA/DELL'ASTRONOMIA/DI/M. BAILLY/RIDOTTA IN COMPENDIO/DAL SIGNOR/FRANCESCO MILIZIA./(ornament)/ BASSANO, MDCCXCI./——/A SPESE REMONDINI DI VENEZIA./Con Licenza de' Superiori./ viii, 290 p. 8°.

63 Bailly's/Geschichte/der/neuern Astronomie./——/Erster Band/Von der Stiftung der alexandrischen Schule bis zu/ihrem Untergange./——/Magni animi res fuit, rerum naturae latebras dimovere, nec/contentum esse exteriori conspectu, introspicere et in deorum/secreta descendere./ Seneca Quaest. nat. L. VI, c. 5./——/Mit dreizehen Kupfertafeln./——/Leipzig,/im Schwickertschen Verlage/ 1796./ 2 v. 8°. Vol. 1: xxiv, 357 p., 13 pl. Vol. 2: /Zweiter Band/Vom Untergang der alexandrischen Schule bis Kepler./. . ./1797/ 390 p. This work was translated and annotated by J. M. C. Bartels.

64 LETTERS/UPON THE/ATLANTIS OF PLATO/AND THE/ANCIENT HISTORY OF ASIA:/INTENDED AS A CONTINUATION OF/LETTERS UPON THE ORIGIN OF THE SCIENCES,/ADDRESSED TO M. DE VOLTAIRE./BY M. BAILLY./——/TRANSLATED FROM THE FRENCH,/BY JAMES JACQUE, ESQ./——/IN TWO VOLUMES./——/VOL. I./——/LONDON:/PRINTED FOR J. WALLIS, PATERNOSTER-ROW; CARPEN-/TER AND CO. OLD BOND-STREET; EGGERTON, WHITE-/HALL; VERNOR AND HOOD, POULTRY; AND/BLACK AND PARRY, LEADENHALL-STREET./——/1801./ 2 v. 8°. Vol. 1: viii, 280 p. Vol. 2: /VOL. II./ 345 p. The title of this translation is misleading. Vol. 1 contains a translation of the *Lettres sur l'origine des sciences;* vol. 2, the *Lettres sur l'Atlantide.* The text of vol. 1 is preceded by a brief account of Bailly's life based on Delisle de Sales' *éloge* and Pagès' *Secret history.*

*65 Denkschrift eines Augenzeugen der französischen Revolution . . . Nachgelassenes Werk. Ubersetzung von Christian Weyland. Leipzig, Hartknoch, 1805. vi, 530 p. 8°. (Deutcher Gesamtkatalog.)

66 THE/ANCIENT HISTORY/OF/ASIA,/AND/REMARKS ON THE ATLANTIS OF PLATO;/TO WHICH ARE ADDED,/OBSERVATIONS ON THE LEARNING OF THE/ANCIENT BRAHMANS:/IN A SERIES OF LETTERS ADDRESSED TO/M. DE VOLTAIRE./——/ BY M. BAILLY./WITH THE LIFE OF THE AUTHOR./——/IN TWO VOLUMES./VOL. I./——/LONDON:/PRINTED FOR J. COX-HEAD, HOLYWELL-STREET,/STRAND:/By B. McMillan, Bow Street, Covent Garden./——/1814./ 2 v. 8°. Vol. 1: [viii], 280 p., front. Vol. 2: /VOL. II./ 345 p., front. This is a reprint of number 64 above.

67 ANIMAL MAGNETISM./——/REPORT OF DR. FRANKLIN/AND OTHER COMMISSIONERS,/CHARGED BY THE KING OF FRANCE WITH THE EXAMINATION OF THE/ANIMAL MAGNETISM AS PRACTISED AT PARIS./Translated from the French./WITH/ AN HISTORICAL OUTLINE OF THE "SCIENCE,"/AN ABSTRACT OF THE/REPORT ON MAGNETIC EXPERIMENTS,/Made by a Committee of the Royal Academy of Medicine, in 1831,/ AND/Remarks on Col. Stone's Pamphlet./——/PHILADELPHIA:/PUBLISHED BY H. PERKINS, CHESTNUT STREET./ 1837./ 2 p. l., 58 p. 8°.

68 BAILLY/und/die ersten Tage/der Französischen Revolution./Von/Edgar Bauer./——/Leipzig./Voigt und Fernan's Separat-Conto./1847./ 148 p. 8°. This translation of extracts from Bailly's memoirs bears the subtitle: Denkschrift eines Augenzeugen der französischen Revolution, oder Tagebuch der Ereignisse, welche sich unter seinen Augen begaben und welche die französische Verfassung vorbereiteten und befestigten. It constitutes vol. 1, part 1, of Bauer, Bruno, Edgar Bauer and Ernst Jungnitz, *Geschichte der Französischen Revolution bis zur Stiftung der Republik.* Leipzig, Voigt etc., 1847. 3 v.

Section 3. Official papers, letters, speeches, etc., 1789–1791

Note: Additional items will be found in Paris, Commune, *Actes de la Commune de Paris pendant la Révolution française*, Series 1 and 2, published under the direction of Sigismond Lacroix and others, and in the Bailly-Necker and Bailly-Lafayette correspondence published by Paul Robiquet. See *infra*, Part II.

69 DISCOURS/AU ROI,/PRONONCÉ par M. BAILLY, doyen de/la chambre des communes, le 6 juin./SUIVI DE LA RÉPONSE DU ROI./——/1789./ 6, [1] p. 8°. Reprinted in *Avant-Moniteur*, XVIII.

70 Réponse à une députation du clergé, 6 juin 1789. *Avant-Moniteur*, XVIII.

71 Réponse à une députation de la noblesse, 6 juin 1789. *Avant-Moniteur*, XIX.

72 Réponse aux députés de la noblesse qui apportaient à l'assemblée des communes un arrêté de leur ordre, le 16 juin 1789. DISC MEM **1**: 389.

73 Réponse aux députés de la noblesse qui apportaient . . . des arrêtés de leur ordre relatifs à des difficultés qui s'étaient élevées sur les députations entières, le 17 juin 1789. DISC MEM **1**: 390.

74 Observations présentées à l'Assemblée nationale, 17 juin 1789. *Avant-Moniteur*, App. IV.

75 RÉPONSE/DE M. BAILLY,/PRÉSIDENT DE L'ASSEMBLÉE NATIONALE,/A L'ORDRE DU CLERGÉ./Le 22 Juin 1789./——/ caption title, 3 p. 8°. Reprinted in DISC MEM **1**: 390 and *Avant-Moniteur*, XXXII.

76 Réponse de M. le Président de l'Assemblée nationale au discours de M. le Comte de Clermont Tonnerre, le 25 Juin 1789. in LETTRE/DE M. NECKER./DU 24 JUIN 1789./ ET DISCOURS/Faits à l'Assemblée Nationale le 25, avec/la Liste de ceux de MM. de la Noblesse/qui se sont présentés./——/ caption title, 18 p. 8°. Reprinted in DISC MEM **1**: 392 and *Avant-Moniteur*, XXXII.

77 DISCOURS/PRONONCÉS A LA SÉANCE/DE L'ASSEMBLÉE NATIONALE./Du 26 Juin 1789./——/discours/de M. l'ARCHEVÊQUE de Paris./caption title. [Paris, Baudouin, 1789.] 19 p. 8°.

78 DISCOURS/PRONONCÉS/A LA SÉANCE/DE/L'ASSEMBLÉE NATIONALE./Du 26 Juin 1789./——/DISCOURS/DE M. L'ARCHEVÊQUE de Paris./caption title. [Paris, Baudouin, 1789.] 11 p. 4°. Items **77** and **78** include: Réponse de M. Bailly, Président, (à M. l'Archevêque de Paris), reprinted in DISC MEM **1**: 393 and *Avant-Moniteur*, XXXVIII; Réponse de M. Bailly aux Députés des Electeurs de Paris, reprinted in DISC MEM **1**: 393 and *Avant-Moniteur*, XXXVIII; and Réponse de M. le Président de l'Assemblé Nationale à MM. les Citoyens de Paris, du 26 juin 1789, reprinted in DISC MEM **1**: 394 and *Avant-Moniteur*, XXXIX.

79 Réponse à MM. les députés de la noblesse non réunie à l'Assemblée nationale, 26 juin 1789. DISC MEM **1**: 394 and *Avant-Moniteur*, XXXVIII.

80 Réponse à la minorité du clergé et à la majorité de la noblesse à leur réunion à l'Assemblée nationale, du 27 juin 1789. DISC MEM **1**: 395 and *Avant-Moniteur*, XL.

81 DISCOURS/DE REMERCIEMENT/DE M. BAILLY,/CI-DEVANT PRÉSIDENT/DE L'ASSEMBLÉE NATIONALE./Ce matin 4 Juillet, à 11 heures & demie après/la lecture du procès-verbal, & quelques/légères discussions sur les pouvoirs de Berry/ & d'Angoulême;/M. BAILLY a demandé la parole & a dit:/caption title, n.p.n.d. 3 p. 8°.

82 Lettre à M. Moreau-de-Saint-Méry, Versailles, 16 juillet 1789. *Avant-Moniteur*, App. XIII.

83 Discours au Roi, 17 juillet 1789. DISC MEM **1**: 397 and *Avant-Moniteur*, LXX.

84 Réponse à une députation du district de St. Etienne du Mont, 18 juillet 1789. *Avant-Moniteur*, LXXIV.

85 Lettre aux Districts, 19 juillet 1789. *Avant-Moniteur*, App. XVI.

86 Lettre à Marmontel, 25 juillet 1789. *Avant-Moniteur*, LXXXIII.

87 Lettre à M. de Bonneville, 25 juillet 1789. *Avant-Moniteur*, App. XVII.

88 Discours à M. Necker après son retour, le jeudi 30 juillet 1789. DISC MEM **1**: 399 and *Avant-Moniteur*, LXXXVI.

89 DISCOURS/DE M. BAILLY,/MAIRE DE LA VILLE DE PARIS,/ A/L'ASSEMBLÉE NATIONALE./——/caption title. [Paris, Baudouin, 1789.] 8 p. 8°.

90 DISCOURS/DE M. BAILLY, Maire de la Ville de Paris, à/ l'ASSEMBLEE NATIONALE./caption title. [Versailles, Baudouin, 1789.] 6 p. 8°. Items 89 and 90 include: Discours de 31 juillet 1789, reprinted in DISC MEM **1**: 399 and *Avant-Moniteur*, LXXXVIII; and Discours de M. Bailly au Roi, reprinted in DISC MEM **1**: 401 and *Avant-Moniteur*, LXXXVIII.

91 Letter to the secretary of Mercy-Argenteau dated "Paris, le 14 août 1789." *Revue rétrospective*, Dixième semestre (January–June 1889), 142–143.

92 LETTRE/DE M. BAILLY,/MAIRE DE PARIS,/A MESSIEURS/ DES DISTRICTS./n.p.n.d. 8 p. 4°. This letter, dated "le 30 août 1789," is reprinted in DISC MEM **1**: 434 and *Mémoires* **3**: 364. In the latter it is erroneously dated "30 août 1790."

93 Réponse à une députation des Volontaires-patriotes de Sedan, 23 septembre 1789. *Avant-Moniteur*, App. XXII.

94 Discours au Roi en recevant sa Majesté à la porte de Paris, 6 octobre 1789. DISC MEM **1**: 402; *Mémoires* **3**: 311; *Avant-Moniteur*, App. XXIII.

95 Discours au Roi, en lui présentant une députation de la commune, 9 octobre 1789. DISC MEM **1**: 403; *Mémoires* **3**: 313; *Avant-Moniteur*, App. XXIV.

96 Discours à la reine, 9 octobre 1789. DISC MEM **1**: 405; *Mémoires* **3**: 314; *Avant-Moniteur*, App. XXV.

97 /——/ADRESSE/De l'Assemblée générale des Représentans de la/Commune de Paris, à toutes les Municipalités du/ Royaume de France./ caption title. n.p.n.d. 3 p. 4°. Signed "10 octobre 1789 . . . Bailly, Maire."

98 Lettre au Président de l'Assemblée des représentans de la commune, 15 octobre 1789. *Avant-Moniteur*, App. XXVI.

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103 Discours au Roi en lui présentant la municipalité, le 24 octobre 1789. DISC MEM **1**: 409.

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105 Discours à l'Assemblée nationale, 3 novembre 1789. *Avant-Moniteur*, App. XXXI.

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109 Discours à l'Assemblée nationale, 7 janvier 1790. *Mémoires* **3**: 321 and *Avant-Moniteur,* App. XXXIV.

110 Lettre au président de l'assemblée des représentans de la commune, 21 janvier 1790. *Avant-Moniteur,* App. XXXV.

111 Discours à un détachement des anciens Gardes-françaises, 26 janvier 1790. *Avant-Moniteur,* App. XXXVI.

112 Discours au Doyen de Notre-Dame, 26 janvier 1790. *Avant-Moniteur,* App. XXXVII.

*113 Discours prononcé par M. le Maire à l'Assemblée de MM. les représentans de la Commune, le . . . 1er février 1790, lors de l'ouverture des comptes de l'administration provisoire de la ville. [Paris], Lottin, 1790. 4 p. 4°. (Bibliothèque Nationale.) Reprinted in DISC MEM **1**: 417; *Mémoires* **3**: 322; *Avant-Moniteur,* App. XXXVIII.

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118 Discours au Roi en lui présentant les soixante présidents des districts et les soixante commandants de bataillon, le 12 février 1790. DISC MEM **1**: 424.

119 Discours à la Reine en lui présentant les soixante présidents des districts et les soixante commandants de bataillon, le 12 février 1790. DISC MEM **1**: 425.

120 Réponse à une députation de Bordeaux, 18 février 1790. *Avant-Moniteur,* App. XLIII.

121 Discours au Roi, 20 février 1790. *Avant-Moniteur,* App. XLIV.

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125 Lettre aux électeurs, 8 mars 1790. *Avant-Moniteur,* App. XLVII.

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128 Lettre au président de l'assemblée des représentans de la Commune, 14 mars 1790. *Mémoires* **3**: 343 and *Avant-Moniteur,* App. L.

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145 Discours au Roi, 11 juin 1790. *Avant-Moniteur,* App. LXIII.

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151 Letter to Jussieu re: mendicity, "Paris, le 17 juillet 1790." *Ibid.*, 100.

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153 Discours à l'Assemblée nationale, 23 juillet 1790. *Avant-Moniteur*, App. LXV.

154 Lettre au président de l'Assemblée nationale, 3 août 1790. *Avant-Moniteur*, App. LXVI.

155 Lettre à M. Peuchet, 4 août 1790. *Avant-Moniteur*, App. LXVII.

156 Lettre aux députés du district de Nantes, 4 août 1790. *Avant-Moniteur*, App. LXVIII.

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158 Lettre aux districts, 30 août 1790. *Avant-Moniteur*, App. LXX.

*159 [Circulaire relative aux attributions de l'Assemblée électorale commençant ainsi: "Paris, 1er septembre 1790. J'ai l'honneur de vous écrire, Monsieur, au nom du Comité de constitution. . . ."] n.p.n.d. 2 p. 4°. (Tourneux, *Bibliographie de l'histoire de Paris pendant la Révolution*. . . .)

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*161 Lettre de M. le président de l'Assemblée des représenants de la Commune . . . à M. le maire. Réponse de M. le Maire . . . Extrait du procès-verbal du 5 octobre 1790. [Paris, Lottin aîné et J. R. Lottin, 1790.] 7 p. 8°. (Bibliothèque Nationale.) Bailly's reply reprinted in *Avant-Moniteur*, App. LXXII.

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184 Lettre à M. Peuchet, 8 mai 1791. *Mémoires* **3**: 377; *Avant-Moniteur*, App. LXXXII.

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187 LETTRE/DE M. BAILLY, MAIRE DE PARIS,/à M. le Feuvre d'Arles, commandant du Bataillon des/Petits-Augustins, sur la liberté du culte religieux./ caption title. n.p.n.d. 4 p.

188 Discours à l'Assemblée nationale à l'époque de la fuite du Roi, 21 juin 1791. *Mémoires* **3**: 390; *Avant-Moniteur,* App. LXXXV.

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203 MUNICIPALITÉ DE PARIS./(ornament)/DISCOURS/PRONONCÉ AU CONSEIL-GÉNÉRAL/DE LA COMMUNE,/LE DOUZE NOVEMBRE MIL SEPT CENT QUATRE-VINGT-ONZE,/Par M. BAILLY, Maire de Paris./——/ Imprimé par ordre du Conseil-général./ caption title. [Paris, Lottin aîné et J. R. Lottin, 1791.] 24 p. 4°. Reprinted in *Recueil,* 163–192.

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